

SIMOGNATHINAE (ACARINA: HALACARIDAE) FROM THE GREAT BARRIER REEF AND CORAL SEA. DESCRIPTION OF THIRTEEN NEW SPECIES

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The simognathine fauna of the Great Barrier Reef and reefs of the Coral Sea has been investigated and one new species of *Acaromantis* and twelve new species of *Simognathus* were found: *Acaromantis diazpuhlooi*, *Simognathus abnormalus*, *S. actius*, *S. aspidiotus*, *S. clypeatus*, *S. corneatus*, *S. exoticus*, *S. platyaspis*, *S. pygmaeus*, *S. specialis*, *S. trachys*, *S. versicolor* and *S. xandarus*. A key to Australian species of Simognathinae is provided, *Acaromantis* is redefined, and the definition of *Simognathus* is commented on. □ *Simognathus*, *Acaromantis*, *Simognathinae*, *Great Barrier Reef*, *Coral Sea*, *Australia*, *Halacaridae*, *marine mites*, *Acari*.

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Mites of the family Halacaridae are benthic inhabitants of marine and freshwater habitats and are assumed to have diverged from semiaquatic prostigmatid ancestors more than 200 million years ago (Bartsch, 1996). Of the 14 subfamilies of Halacaridae which are currently recognised (Abé, 1998; Otto, 1999c), the Simognathinae is among the most conspicuous. Species of this entirely marine subfamily are spindle-shaped and heavily armoured by large dorsal plates which are covered with broad shallow pits (foveae). Their gnathosoma is relatively short and the palps which are inserted close to each other dorsally on the gnathosomal base have no more than three segments. The most remarkable feature is their front legs which possess a large ventral or medial spine on the tibia and a hook-like unpaired claw at the end of the tarsus. The unpaired claw and the tarsus itself are movable and oppose the spine on the tibia, an arrangement which appears suited to catching and holding prey, although, feeding has not been observed.

Simognathine mites are common in intertidal habitats and shallow waters around the globe but are yet to be recorded from the deep sea. The 34 described species are subdivided into two genera, *Acaromantis* Trouessart & Neumann, 1893 and *Simognathus* Trouessart, 1889. So far 25 species of *Simognathus* have been described, seven of these from Australia (Bartsch, 1993b, 1994). *Acaromantis* appears less diverse. Only nine species have been described and none from Australia.

During the present study, which forms part of a broader survey of the halacarid fauna of the Great Barrier Reef and Coral Sea (Otto, 1999a,b,c;

Otto, 2000a,b,c; Otto & Bartsch, 2000; Bartsch, 2000), one species of *Acaromantis* and 12 species of *Simognathus* were found. These represent the first records of Simognathinae from the eastern half of Australia.

METHODS

Sand, coral rubble and pieces of dead coral were collected either intertidally or subtidally using SCUBA equipment. Mites were extracted by washing the substrates in a bowl of water and decanting the supernatant through a 100 µm sieve. All material was collected by the author except where stated otherwise. Mites were cleared in lactic acid and mounted in PVA (Boudreaux & Dosse, 1963). Drawings were made with the aid of a camera lucida.

In the accounts of each species only one sex is described in detail, while for the opposite sex only characters that differ are described. Measurements are in micrometres.

Terminology follows Bartsch (1993a, 1994). To make a clear distinction between parambulacral setae (pas) and ventral setae, only those ventral, ventromedial or ventrolateral setae which are inserted distal to the most distal of the dorsal setae (= fossary setae) are here referred to as pas. In some cases the number of parambulacral setae and ventral setae may therefore differ from those Bartsch (1994) described for similar species. In *Acaromantis* and at least one species of *Simognathus* the tibia and tarsus of leg I is twisted by 90° compared with other halacarid genera. The tarsal claw is therefore pointing inwards instead of downwards in uncompressed

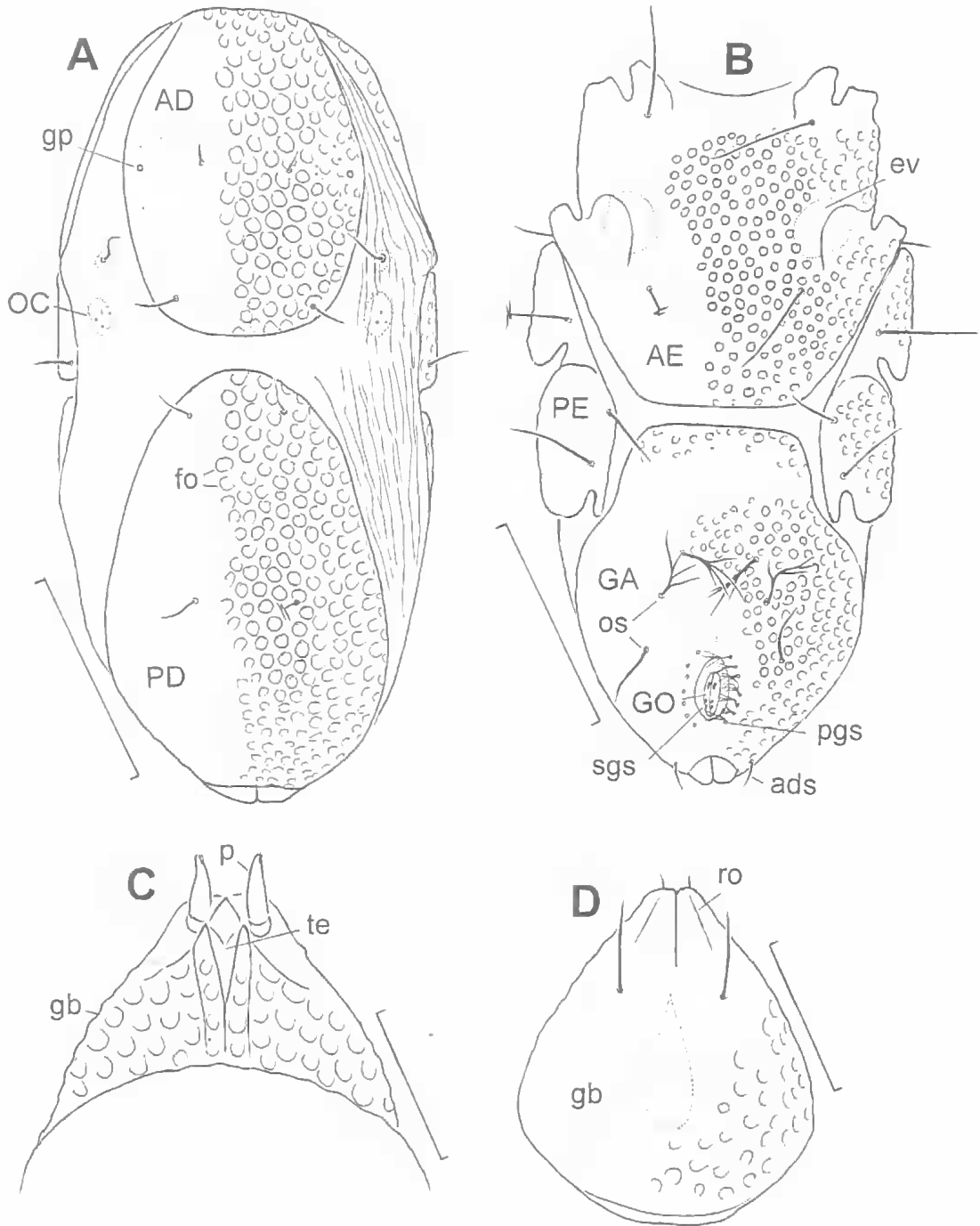


FIG. 1. *Acaromantis diazpuhdoi* sp. nov., ♂: A, idiosoma, dorsal view (AD, anterior dorsal plate; fo, foveae; gp, gland pore; OC, ocular plate; PD, posterior dorsal plate); B, idiosoma, ventral view (ads, adanal seta; AE, anterior epimeral plate; ev, epimeral vesicle; GA, genitoanal plate; GO, genital opening; os, outlying setae; PE, posterior epimeral plate; pgs, perigenital setae; sgs, subgenital setae); C, gnathosoma, dorsal view (gb, gnathosomal base; p, palp; te, tectum); D, gnathosoma, ventral view (ro, rostrum). Scale bars: A, B = 100 μ m; C, D = 50 μ m.

specimens. To be consistent with descriptions of other genera the terms medial, lateral, dorsal and ventral for tibia and tarsus I are applied as if these segments were oriented in the usual way with the tarsal claw pointing downwards. Accounts of chaetotaxy are from trochanter to tibia only.

Abbreviations: Descriptive - AD, anterior dorsal plate; AE, anterior epimeral plate; GA, genitoanal plate; GO, genital opening; OC, ocular plate; PD, posterior dorsal plate; PE, posterior epimeral plate; P-2, P-3, second and third palp segments, respectively, counted from base of palp; I-IV, leg I to leg IV; pas, parambulacral seta(e); pgs, perigenital seta(e); sgs, subgenital seta(e). Additional abbreviations in the illustrations are explained in the captions. GBR, Great Barrier Reef Marine Park; I, Island; Rf, Reef. Other abbreviations: ANIC, Australian National Insect Collection, Canberra (Australia), MTQ, Queensland Museum branch of the Museum of Tropical Queensland, Townsville (Australia); ZMH, Zoologisches Museum Hamburg (Germany). All specimens with the accession number prefix QMS are deposited in the MTQ.

SYSTEMATICS

Acaromantis Trouessart & Neumann

Acaromantis Trouessart & Neumann 1893: 207; André, 1946: 138; Viets, 1956: 696; Morselli, 1970: 109; Bartsch, 1974: 280; 1976: 664; 1977: 92(530); 1980: 401; 1983: 194; Bartsch & Schmidt, 1978: 22 (644).

TYPE SPECIES. *Acaromantis squilla* Trouessart & Neumann, 1893, by monotypy and original designation.

DIAGNOSIS. Body spindle-shaped. Dorsal plates covered by foveae. Palps separated by less than their width, inserted dorsally on gnathosoma and two-segmented. Tibia of front leg at least as long as three times its height, apically narrowing and equipped with a heavy spine. Tarsus of same leg shorter than 1/3 the length of tibia, with a heavy apical claw but no paired claws. Genu of leg I with a spinose seta. Telo femur I with a single seta.

Acaromantis diazpulidoi sp. nov. (Figs 1, 2)

ETYMOLOGY. For Guillermo Diaz-Pulido who collected the holotype.

MATERIAL. HOLOTYPE: QMS105316, ♂, Coral Sea (Queensland Plateau), Chilcott I., 16°56.51'S 150°0.4'E, 14 Sep. 1998, G. A. Diaz-Pulido coll., coarse sand at 10-15m.

DESCRIPTION. *Male*. Idiosoma 354 long. AD longer than wide; foveate throughout (Fig. 1A); two pairs of setae and pair of barely visible gland pores as illustrated; scattered canaliculi around pores. OC reduced to more or less oval subcuticular platelet carrying few canaliculi. Anterior to OC with seta on a small subcuticular platelet. PD clearly longer than wide; anterior margin rounded; with two pairs of setae. GA foveate except for an anterior transverse smooth area (Fig. 1B); two pairs of branched outlying setae anterior to GO and one pair of unbranched setae level with anterior margin of GO; 14 branched pgs surrounding GO; three pairs of short sgs. Adanal setae ventrally on anal cone.

Tectum with an upper split part and a lower pointed part (Fig. 1C). Ventral gnathosomal base with foveae posterolaterally and posteriorly, medially smooth (Fig. 1D). Palp two-segmented (Fig. 2A); P-2 with heavy ventral seta, one slender dorsal seta and two apical setae.

Outline of legs as shown in Fig. 2B-E. Chaetotaxy: I 1-2-1-4-5 (Fig. 2B), II 1-2-2-4-5 (Fig. 2C), III 1-1-2-3-5 (Fig. 2D), IV 1-1-2-3-5 (Fig. 2E). Genu I with a strongly spinose ventral seta. One small branched seta dorsally on tibiae III and IV, two such setae on genua III and IV, one on telofemur III and two on telofemur IV (oil immersion). Tibial spine and tarsal claw of leg I prior to compression of slide medially directed. Tibiae II-IV with pair of ventral coarsely bipectinate setae. Paired fossary setae of tarsi II-IV slightly serrated. Tarsi II-IV without median claw. Tarsus III with ventral seta and pair of pas. Tarsus IV with two ventral setae and pair of pas. Paired claws of tarsi II-IV with accessory process and pecten.

Female. Unknown.

REMARKS. *Acaromantis diazpulidoi* sp. nov. is the first species of *Acaromantis* known from Australia. With its two palp segments, single seta on telofemur I, presence of a spinose seta on genu I, short tarsus I, slender and in the proximal half conspicuously widened tibia I and lack of paired claws on tarsus I, *A. diazpulidoi* is a typical representative of *Acaromantis*. It differs from all its congeners by the shape of its tectum, which is characteristically split in contrast to being entire and scale-like. Males can also be identified by the presence of three pairs of outlying setae, of which the two anteriormost pairs are branched. Such an arrangement of setae is unknown for any other species of *Acaromantis*.

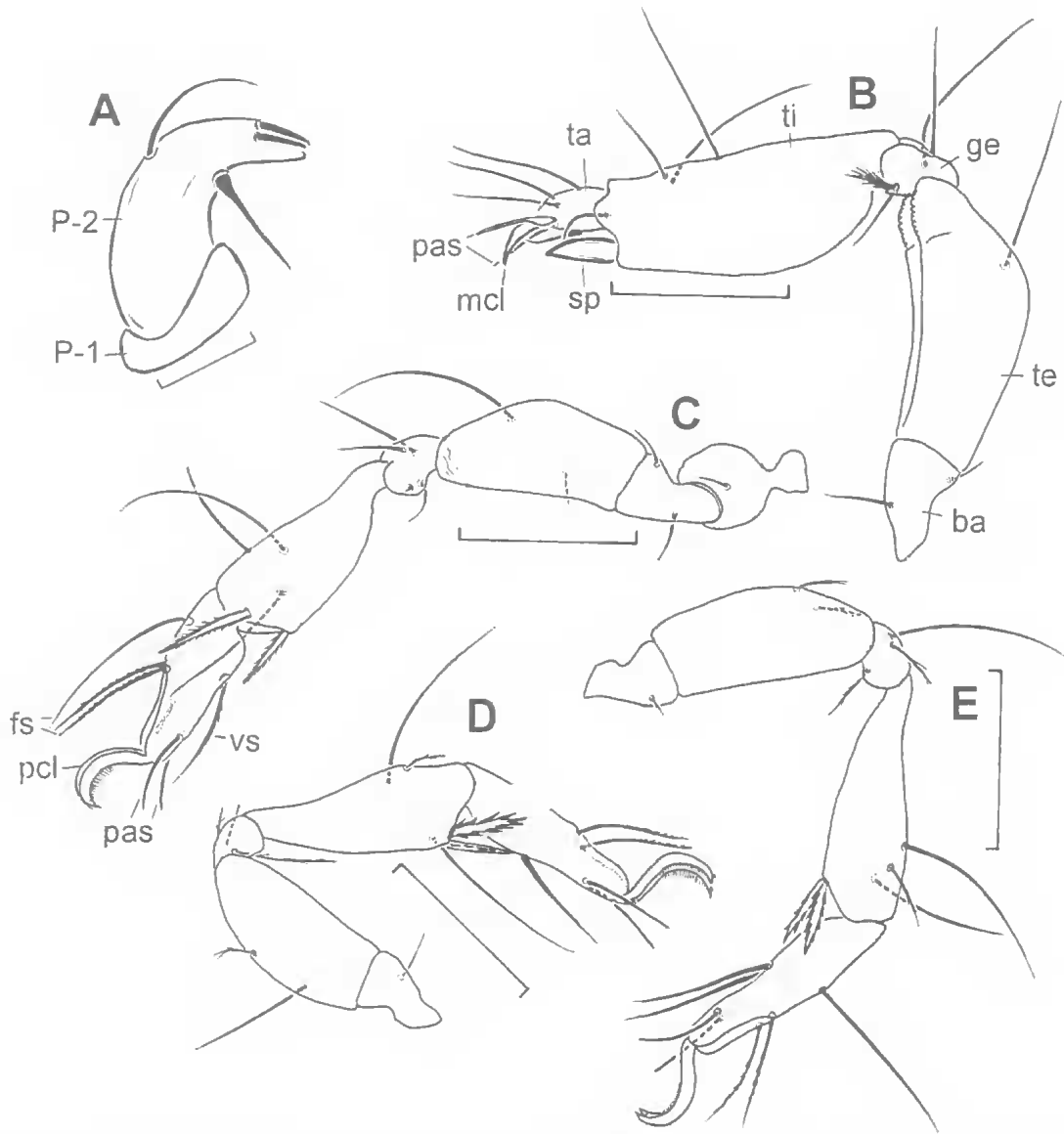


FIG. 2. *Acaromantis diaz-pulidoi* sp. nov., ♂: A, palp, medial view (P-1, P-2, palp segments); B, leg I, medial view (ba, basifemur; ge, genu; mcl, median claw; pas, parambulacral setae; sp, spine; ta, tarsus; te, telofemur; ti, tibia); C, leg II, medial view (fs, fossary setae; pas, parambulacral setae; pcl, paired claw; vs, ventral seta); D, leg III, medial view); E, leg IV, medial view. Scale bars: A = 10 μ m; B-E = 50 μ m.

Simognathus Trouessart

Simognathus Trouessart, 1889: 1180; Viets, 1927: 151; 1936: 421; 1940: 94; 1956: 694. André, 1946: 135; Fountain, 1953: 357; Monniot, 1961: 585; 1962: 288; Bartsch, 1974: 275; 1977: 87 (525); 1978: 19; 1983: 193; 1985: 554; 1993b: 95; 1994: 135; Newell, 1947: 23; 1971: 36; 1984: 264.

Ischyrogathus Trouessart, 1901; Newell, 1947: 23, 37; Viets, 1956: 694; Synonymy by Bartsch, 1974.

TYPE SPECIES. *Pachygnathus sculptus* Brady, 1875 (= *Pachygnathus minutus* Hodge, 1863; synonymy by Fountain (1953)); by original designation.

DIAGNOSIS. Body spindle-shaped. Dorsal plates covered by foveae. Palps separated by less than their width, inserted dorsally on gnathosoma and three-segmented. Tibia of front legs usually shorter than three times its height (exception: *S.*

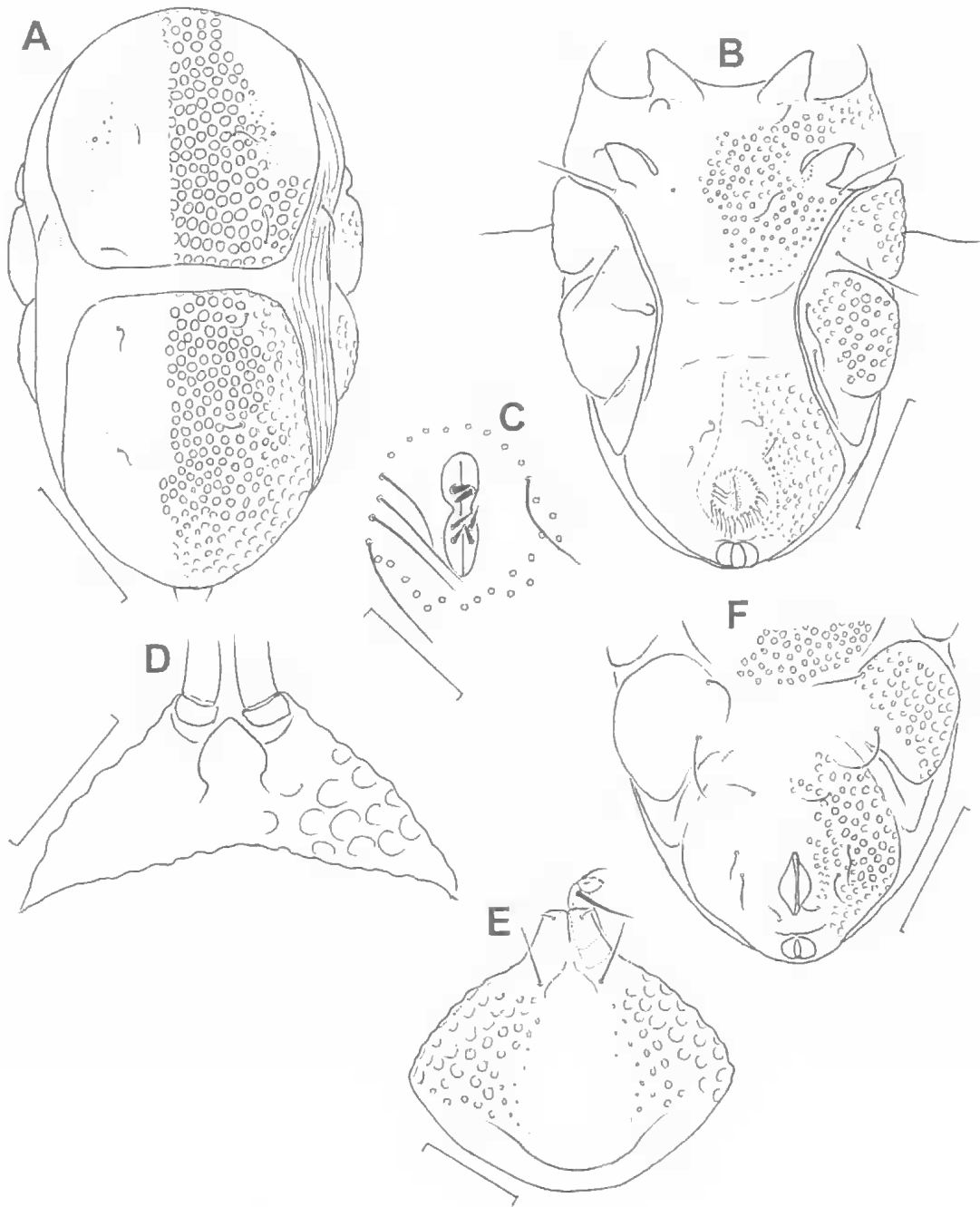


FIG. 3. *Simognathus abnormalus* sp. nov., adult: A, idiosoma, dorsal view; B, ♂ idiosoma, ventral view; C, ♂ genital opening; D, gnathosoma, dorsal view; E, gnathosoma, ventral view; F, posterior half of ♀ idiosoma, ventral view. Scale bars: A, B = 100µm; C = 25µm; D, E = 50µm; F = 100µm.

abnormalus, *S. scutatus*), equipped with a heavy spine and tarsus of same legs with a heavy apical claw and slender seta-like paired claws. Tarsus I

usually longer than 1/3 the length of tibia (exception: *S. abnormalus*, *S. scutatus*), with heavy median claw and slender, sometimes seta-

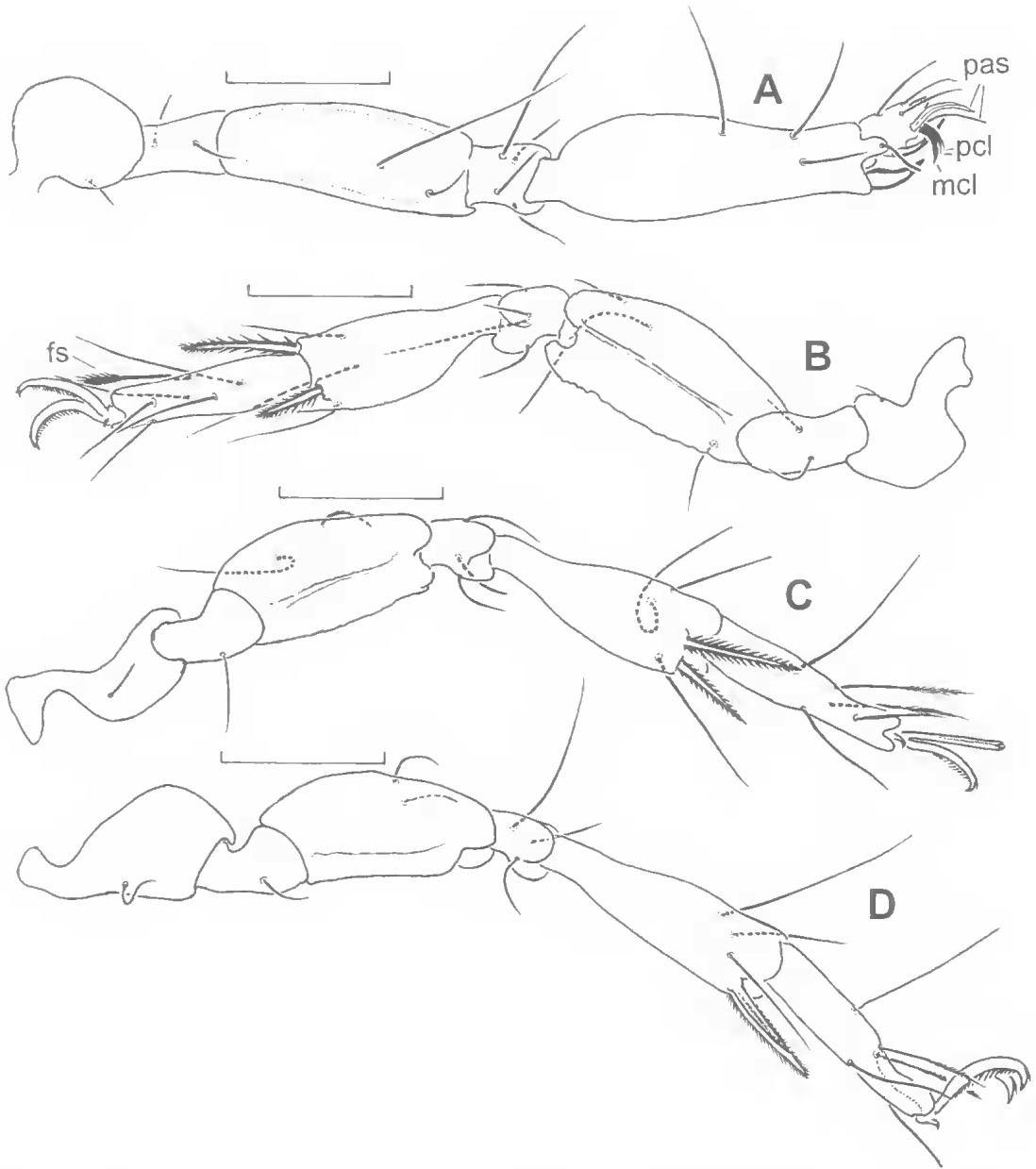


FIG. 4. *Simognathus abnormalus* sp. nov., adult: A, leg I, dorsal view (mcl, median claw; pcl, paired claws; pas, parambulacral setae); B, leg II, ventral view (fs, fossary seta); C, leg III, ventral view; D, leg IV, lateral view. Scale bars: A-D = 50 μ m.

like paired claws. All setae of genu of leg I glabrous. Telfemur I usually with two setae (exception: *S. pygmaeus* sp. nov).

***Simognathus abnormalus* sp. nov.**
(Figs 3, 4)

ETYMOLOGY. Referring to the front legs' short tarsus and slender tibia, and the peculiar orientation of these leg segments.

MATERIAL. HOLOTYPE: QMS105317, ♂, GBR, 18°41.91'S 147°06.49'E, Loadstone Rf, 12 Apr. 1998, sand & rubble at 2m. PARATYPES: QMS105318, ♀, data as for holotype; QMS105319, ♀, ANIC, ♀, GBR, 18°16.69'S 147°23.21'E, Myrmidon Rf, 14 Apr. 1998, coarse sand at 12m; ZMH.A32/99, ♀, GBR, 19°20.12'S 149°02.85'E, Elizabeth Rf, 25 Dec. 1997, coarse sand & rubble at 3m; QMS105320, ♀, QMS105321, ♂, GBR, Rosser Rf, ca. 15°37'S 145°33'E, 8 Oct. 1998, sand at 2m; QMS105322, ♂, QMS105323, ♀, Coral Sea (Queensland Plateau), Chilcott I., 16°56.51'S 150°0.4'E, 14 Sep. 1998, G.A. Diaz-Pulido, coarse sand at 10-15m; QMS105324/105325, 2 ♀s, Coral Sea (Queensland Plateau), South Willis I., ca. 16°18'S 149°58'E, 15 Sep. 1998, G.A. Diaz-Pulido, coral rubble (fine) at 0-10m.

DESCRIPTION. *Male.* Idiosoma 412-424 long (holotype 424). AD of subequal length and width; with a non-foveate area anterolaterally (Fig. 3A). OC reduced to oblong subcuticular platelet which carries a seta anteriorly. PD slightly longer than wide; anterior margin truncated; with three pairs of setae (including adanal setae). AE broadly fused to GA (Fig. 3B), in some specimens AE and GA also fused to PE (as shown for ♀ in Fig. 3F). AE and PE foveate throughout (Fig. 3B), GA foveate except for area along median axis (Fig. 3B); two pairs of outlying setae anterior to GO; 28-30 pgs surrounding GO in a circle (Fig. 3B,C); GO with three pairs of short sgs (Fig. 3C).

Gnathosomal base wider than long (Fig. 3D,E); tectum wide, narrowing anteriorly (Fig. 3D); ventrally foveate except for a relatively wide area along the median axis (Fig. 3E). Palp three-segmented; P-2 with heavy ventral seta; P-3 with three short setae and one longer seta.

Outline of legs as in Fig. 4. Chaetotaxy: I 1-2-2-4-5 (Fig. 4A), II 1-2-3-4-5 (Fig. 4B), III 1-1-2-3-5 (Fig. 4C), IV 1-1-2-3-5 (Fig. 4D). Tibia I long and slender, narrowing apically. All setae of genu I slender and glabrous. In uncompressed specimens tibial spine and tarsal claw of leg I medially directed. Tarsus II with the medial fossary seta apically widened and serrated. Tarsi III and IV with single ventral seta and one unpaired pas. Distal pair of fossary setae of tarsi III and IV apically serrated. Tarsi II-IV with small median claw; paired claws bearing pecten along most of the shaft, most conspicuous on tarsus IV.

Female. Idiosoma 417-420 long. GA with four pairs of pgs and no sgs (Fig. 3F). OC in some specimens shorter and more rounded than illustrated for male.

REMARKS. *Simognathus abnormalus* is most similar to *S. scutatus* Bartsch, 1993b. Both

species possess fused ventral plates, oblong OC and a relatively slender tibia and short tarsus on leg I, a combination of characters that is unknown for other species in the genus. *Simognathus abnormalus* can be distinguished from *S. scutatus* by having wider dorsal plates, a larger body, and a wide non-foveate area medially on the ventral gnathosomal base.

***Simognathus actius* sp. nov.**

(Figs 5, 6)

ETYMOLOGY. Latin, *acta* = coast, referring to this species' occurrence on beaches.

MATERIAL. HOLOTYPE: QMS105326, ♀, GBR, 19°16.09'S 147°03.05'E, Cape Ferguson, 8 Nov. 1997, intertidal sand on beach, sediment depth 40cm. PARATYPES: QMS105327, ♀, ANIC, ♀, ZMH.A33/99, ♀, QMS105328, ♂, data as for holotype; QMS105329, ♂, GBR, Wonga Beach, 16°21'S 145°26'E, 31 July 1998, sand below high tide mark, sediment depth 40cm; QMS105330-105334, 5 ♀s, GBR, Lizard I., Mermaid Cove, 14 Oct. 1998, coarse sand at high tide level, sediment depth 10-20cm.

Female. Idiosoma 244-272 long (holotype 267). All dorsal setae short (Fig. 5A). AD uniformly pale, either of similar width in anterior and posterior half or posterior half slightly wider; posterior margin rounded; laterally with scattered pits. OC reduced to minute plate with a seta. PD pear-shaped; with three pairs of setae including adanal setae. AE with foveae only laterally and along posterior margin (Fig. 5B); remainder of plate punctate; epimeral vesicle large, GA with foveae in posterior 2/3 and along anterior margin; remainder of plate punctate; 3-4 pairs of pgs.

Dorsal gnathosomal base with large irregularly shaped foveae (Fig. 5D). Tectum pointed. Ventral gnathosomal base foveate except medially (Fig. 5E). P-2 with a ventral seta and a poorly developed ventral protuberance proximal to seta. P-3 longer than half the length of P-2.

Outline of legs as in Fig. 6. Telofemora with few foveae, on leg I more numerous and more conspicuous than on other legs (Fig. 6A). Chaetotaxy: I 1-2-2-4-5 (Fig. 6A), II 1-2-2-4-5 (Fig. 6B), III 1-1-2-3-5 (Fig. 6C), IV 1-1-1-3-5 (Fig. 6D). Heavy ventral spine of tibia I without proximal swelling; seta adjacent to spine branched (Fig. 6A, arrowed). Tarsus II with pair of pas but without ventral seta, tarsi III and IV with single ventral seta but without pas. Paired claws of tarsi II-IV with apical cluster of pecten.

Male. Idiosoma 241-250 long. GA with 16-17 pgs (Fig. 5C). Sgs not seen.

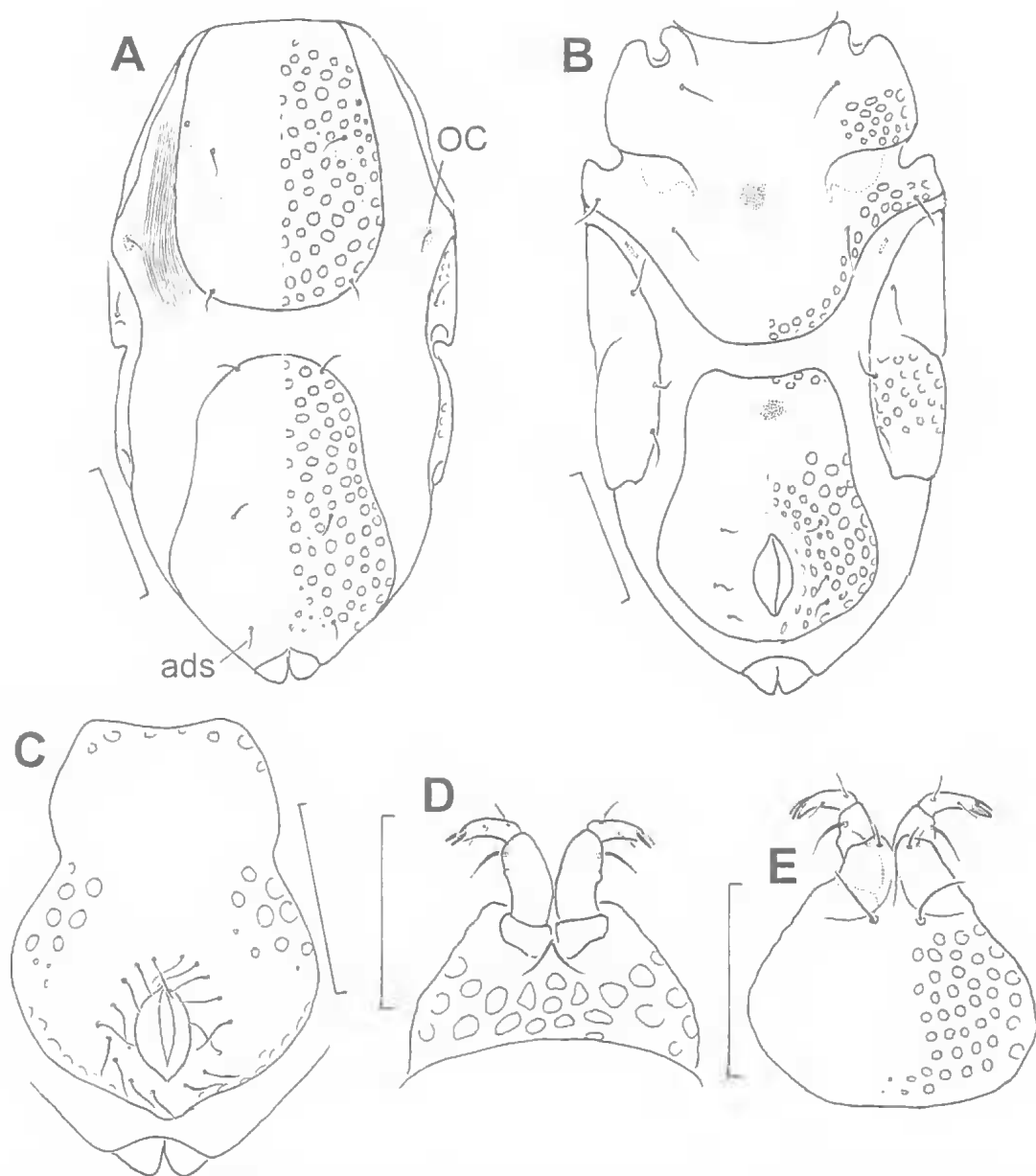


FIG. 5. *Simognathus actius* sp. nov., adult: A, idiosoma, dorsal view (OC, ocular plate; ads, adanal seta); B, ♀ idiosoma, ventral view; C, ♂ genitoanal plate; D, gnathosoma, dorsal view; E, gnathosoma, ventral view. Scale bars: A-E = 50µm.

REMARKS. *Simognathus actius* sp. nov. differs from its congeners by having a branched seta on tibia I adjacent to the ventral spine and a narrow band of foveae along the posterior margin of the AE.

Although all examined specimens are identical in the characters described above they differ

slightly in the striation of the membranous cuticle. In the specimens from Cape Ferguson the striation is conspicuously finer (Fig. 5A) than in all remaining specimens. This character is here not regarded as sufficient evidence for separating these specimens into different species although it

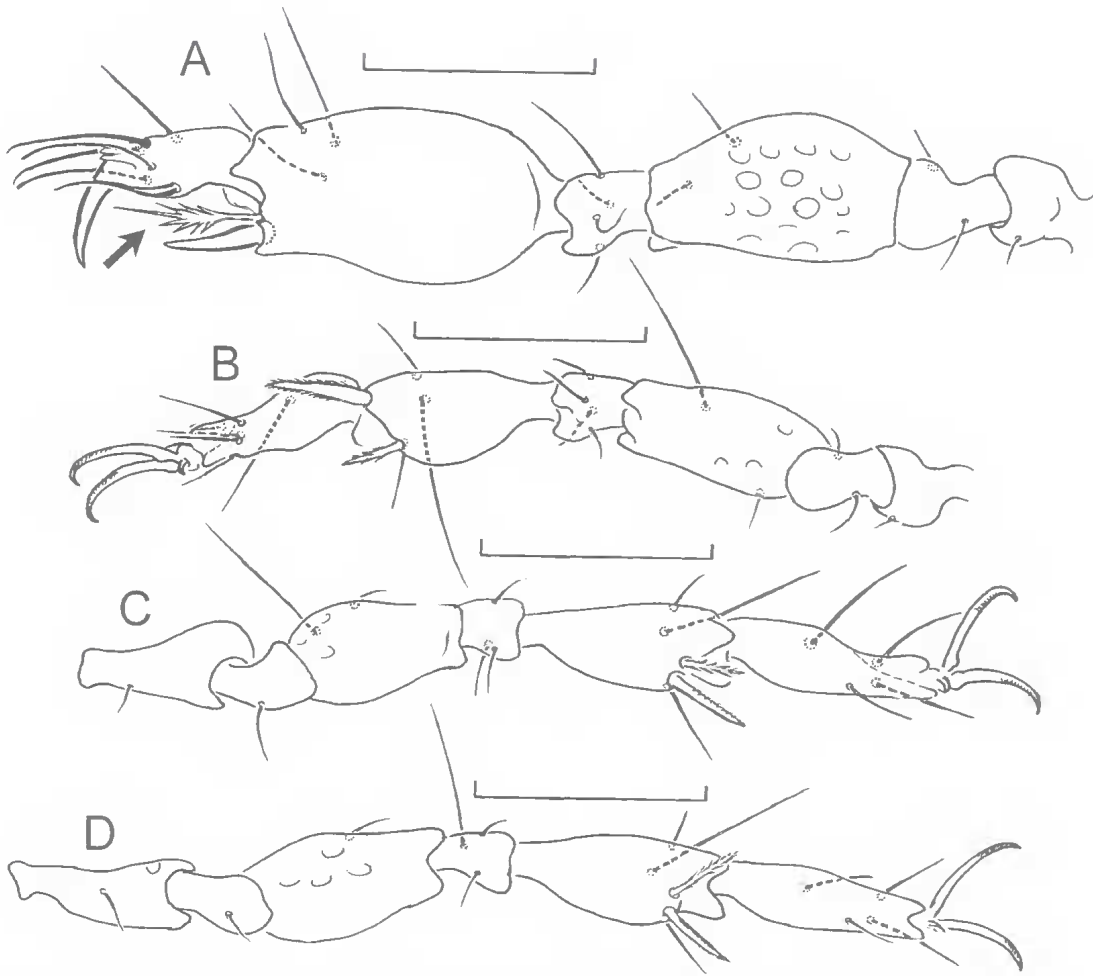


FIG. 6. *Simognathus actius* sp. nov., adult: A, leg I, lateral view; B, leg II, ventromedial view; C, leg III, ventromedial view; D, leg IV, ventromedial view. Scale bars: A-D = 50 μ m.

may indicate a certain amount of genetic isolation between them.

***Simognathus aspidiotus* sp. nov.**
(Figs 7, 8)

ETYMOLOGY. Greek, *aspidiotes* = shield bearer, referring to the species' fused ventral plates.

MATERIAL. HOLOTYPE: QMS105335, ♀, GBR, Mymidon Rf, 18°16.69'S 147°23.21'E, 14 Apr. 1998, coarse sand & rubble at 15m. PARATYPES: QMS105336, ♀, ANIC, ♀, ZMH A34/993, ♀, GBR, 19°20.12'S 149°02.85'E, Elizabeth Rf, 25 Dec. 1997, coarse sand & rubble at 3m; QMS1053371, ♀, GBR, 18°42.03'S 147°06.54'E, Loadstone Rf, 12 Apr. 1998, coarse sand & rubble at 12-15m; QMS105338/105339, 2 ♀s, GBR, 18°38.25'S 147°04.42'E, John Brewer Rf, 11 Apr. 1998, coarse sand at 15m; QMS105340/S105341, 2 ♀s, GBR,

Rosser Rf, ca. 15°37'S 145°33'E, 8 Oct. 1998, sand at 2m; QMS105342, ♂, GBR, Boulder Rf, ca. 15.24'S 145.27'E, 8 Oct. 1998, coarse intertidal sand; QMS1053431, ♀, GBR, Boulder Rf, ca. 15°24'S 145°27'E, 8 Oct. 1998, A. Thompson, coarse sand at 2m; QMS105344, ♀, Coral Sea (Queensland Plateau), Lihou Rf, ca. 17°25'S 151°40'E, 22 July 1998, D. Fenner, sand at 7m; QMS105345, ♀, Coral Sea (Queensland Plateau), Flinders Rf, ca. 17°35'S 148°27'E, July 1998, D. Fenner, sand; QMS105346/S105347, 2 ♂s, QMS105348, ♀, Coral Sea (Queensland Plateau), Herald Cays, 16°57.171'S 149°12.036'E, 16 Sep. 1998, G.A. Diaz-Pulido, coarse sand at 5-15m; QMS105349, ♀, Coral Sea (Queensland Plateau), South Willis I., ca. 16°18'S 149°58'E, 15 Sep. 1998, G.A. Diaz-Pulido, coral rubble (fine) at 0-10m; QMS105350, ♀, Coral Sea (Queensland Plateau), Chilcott I., 16°56.51'S 150°0.4E', 14 Sep. 1998, G.A. Diaz-Pulido, coarse sand at 10-15m.

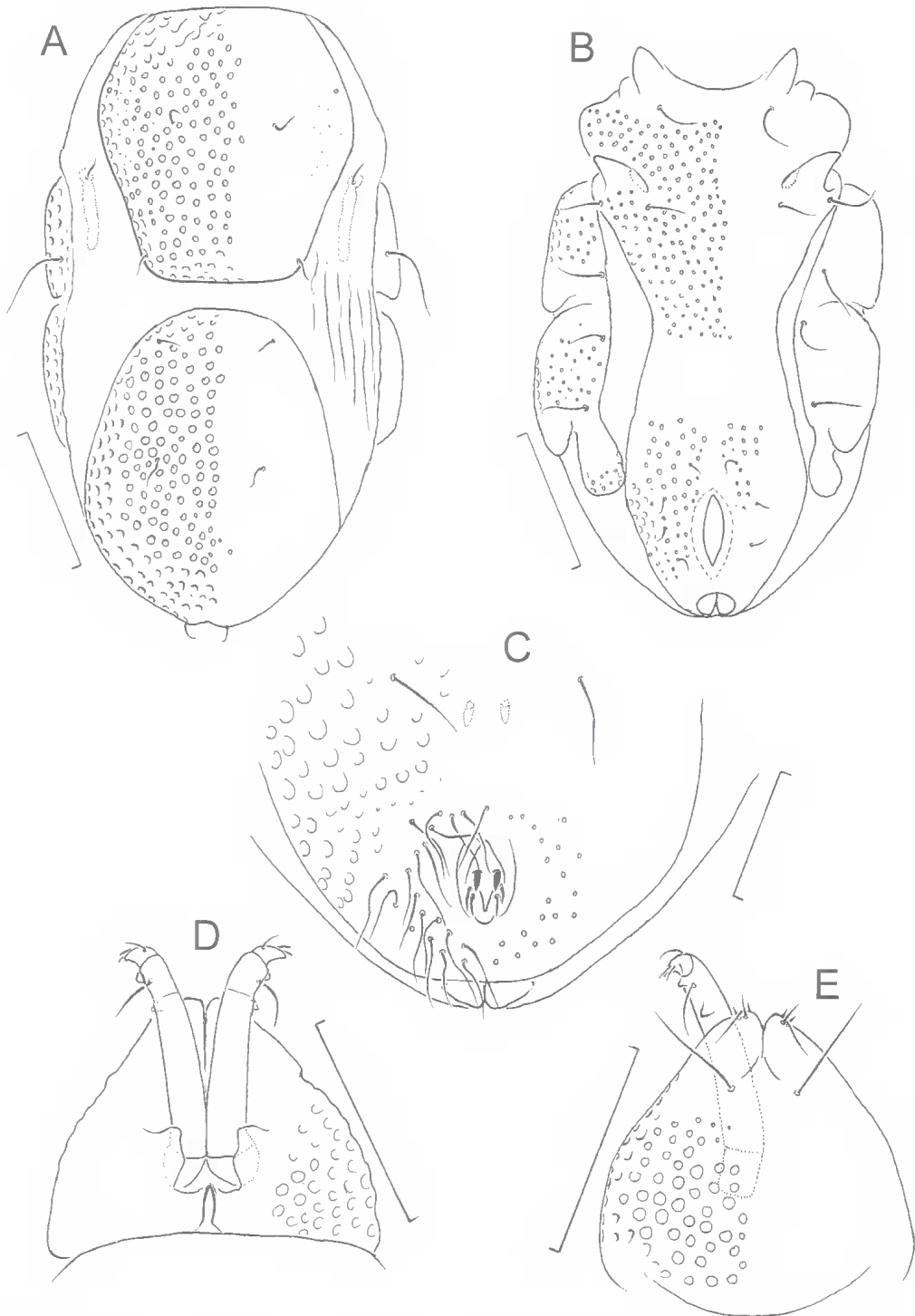


FIG. 7. *Simognathus aspidiotus* sp. nov., adult: A, idiosoma, dorsal view; B, ♀ idiosoma, ventral view; C, posterior part of ♂ genitoanal plate; D, gnathosoma, dorsal view; E, gnathosoma, ventral view. Scale bars: A,B,D,E = 100µm; C = 25µm.

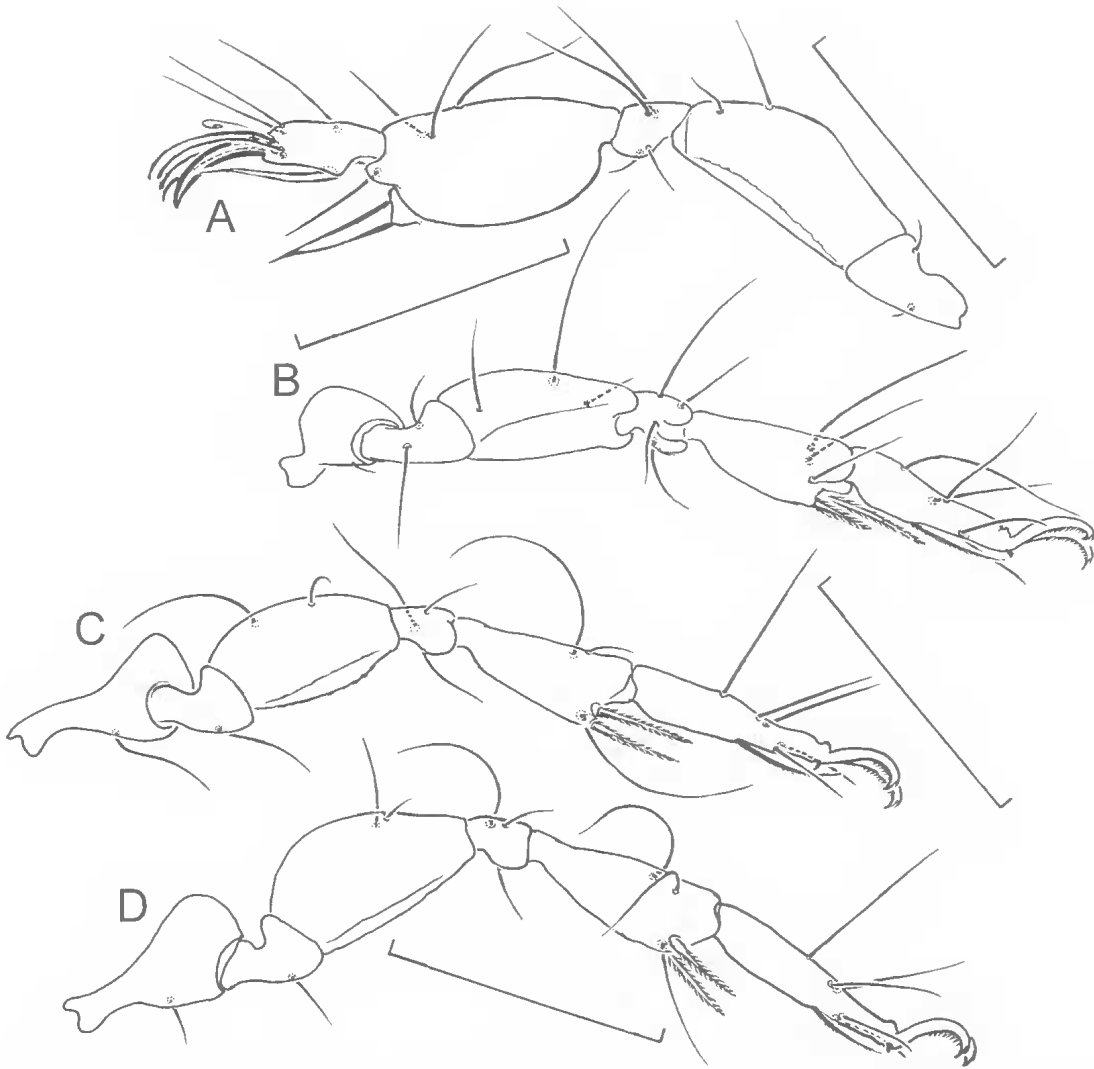


FIG. 8. *Simognathus aspidiotus* sp. nov., adult: A, leg I, medial view, trochanter excluded; B, leg II, lateral view; C, leg III, medial view; D, leg IV, medial view. Scale bars: A-D = 100 μ m.

DESCRIPTION. *Female.* Idiosoma 376-476 long (holotype 404). AD uniformly pale; anteriorly widened, posterior margin truncated (Fig. 7A). OC reduced to small oblong subcuticular platelet which carries a seta anteriorly. PD with three pairs of setae (including adanal setae). AE broadly fused to GA (Fig. 7B). AE foveate throughout; epimeral vesicles inconspicuous; four pairs of pgs, in some specimens with four setae on one side and three on the other (Fig. 7B).

Tectum narrow (Fig. 7D). Ventral gnathosomal base foveate throughout. Palps inserted on posterior half of dorsally visible part of gnathosomal base (Fig. 7D). Segment P-2 with one

ventral seta inserted between two protuberances (Fig. 7E); P-3 shorter than 1/4 of P-2.

Outline of legs as in Fig. 8. All segments without foveae. Telfemora slender. Chaetotaxy: I 1-2-2-4-5 (Fig. 8A), II 1-2-3-4-5 (Fig. 8B), III 1-1-2-3-5 (Fig. 8C), IV 1-1-2-3-5 (Fig. 8D). Ventral spine of tibia I without proximal swelling. Tarsi II-IV with ventral slightly serrated seta and pair of pas. Paired claws of tarsi II-IV with coarse pecten along most of shaft.

Male. Idiosoma 368-420 long. GA with pair of outlying setae anterior to GO and 38-41 pgs surrounding GO (Fig. 7C); three pairs of sgs, anteriormost pair thickened, other two pairs slender.

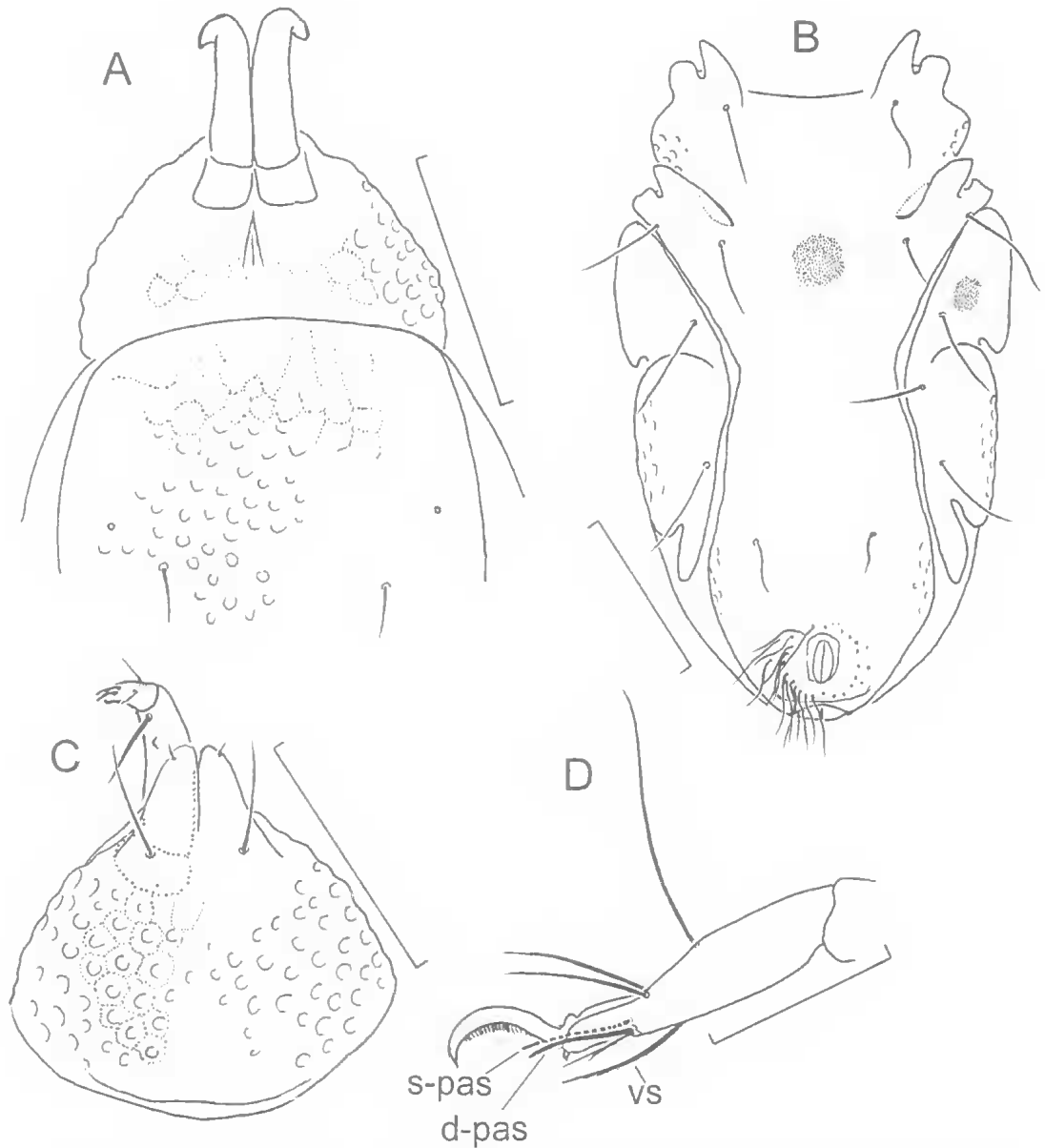


FIG. 9. *Simognathus clypeatus* sp. nov., adult: A, gnathosoma and anterior part of idiosoma, dorsal view; B, ♂ idiosoma, ventral view; C, gnathosoma, ventral view; D, tarsus IV, medial view (s-pas, single pas; d-pas, doubled pas. Scale bars: A-C = 100 μ m; D = 50 μ m).

REMARKS. The only other species of *Simognathus* in which the ventral plates are fused, the OC are reduced to oblong subcuticular platelets and the seta on P-2 is inserted between two cuticular projections is *S. uniscutatus* Bartsch, 1994. *Simognathus aspidiotus* sp. nov. differs from it in having two pas (instead of one) on each of tarsi III

and IV and two instead of three setae on basifemur I. The overall similarity between both species suggests a close relationship.

***Simognathus clypeatus* sp. nov.**
(Fig. 9)

ETYMOLOGY. Latin, *clypeatus* = provided with a shield, referring to this species' fused ventral plates.

MATERIAL. HOLOTYPE: QMS105351, ♂, Coral Sea (Queensland Plateau), Herald Cays, 16° 57.171'S 149° 12.036'E, 16 Sep. 1998, G.A. Diaz-Pulido, coarse sand at 5-15m. PARATYPES: QMS105352, ♀, data as for holotype.

DESCRIPTION. *Male*. Idiosoma 408 long. AD, OC, and PD as described for *Simognathus aspidiotus* sp. nov. except anterior AD without foveae and instead with canaliculi arranged in lines that form a loosely reticulated pattern (Fig. 9A). AE and GA fused, both without foveae, except for an area posterior to insertions of leg I and, less conspicuously, lateral on GA (Fig. 9B); non-foveate remainder of plate finely punctate. GA with 32 pgs around GO and one pair of outlying setae. Sgs not seen. PE finely punctate, posterior to insertions of leg III foveate.

Tectum narrow and pointed (Fig. 9A). Dorsal gnathosomal base in deeper cuticular layers with series of canaliculi arranged as shown in Fig. 9A; similar arrangement of canaliculi also on ventral gnathosoma (Fig. 9C). Palps inserted well anterior on gnathosomal base; P-2 with poorly developed protrusion proximal to ventral seta (Fig. 9C).

Morphology and setation of legs as described for *S. aspidiotus* except tarsus IV with a doubled medial pas, of which the ventral branch is much thinner than the dorsal one (Fig. 9D).

Female. Idiosoma 432 long. GA with foveae lateral and anterolateral to GO and with four pairs of pgs (as illustrated for *S. aspidiotus*, Fig. 7B).

REMARKS. *Simognathus clypeatus* has the AE and GA fused and the OC reduced to subcuticular oblong platelets, a combination of characters otherwise only known for *S. abnormalus* sp. nov., *S. aspidiotus* sp. nov., *S. scutatus* Bartsch, 1993b and *S. uniscutatus* Bartsch, 1994. *Simognathus clypeatus* differs from these species in having most of the AE finely punctate instead of foveate.

***Simognathus corneatus* sp. nov.**
(Figs 10,11)

ETYMOLOGY. Referring to the large cornea of this species.

MATERIAL. HOLOTYPE: QMS105353, ♂, GBR, Elizabeth Rf, 19°20.12'S 149°02.85'E, 25 Dec. 1997, coarse sand & rubble at 3m. PARATYPES: QMS105354,

♀, ANIC, ♀. GBR. John Brewer Rf, 18°38.25'S 147°04.42'E, 11 Apr. 1998, coarse sand at 15m.

DESCRIPTION. *Male*. Idiosoma 388 long. AD uniformly pale; anteriorly narrowing, with rounded dome-like protuberance: truncated posteriorly (Fig. 10A). OC well developed, not longer than twice its width; with seta anteriorly. Cornea covering most of OC, with 2-3 depressions posteriorly. PD ca. 1.15 times as long as AD, with two pairs of setae and fewer than 200 foveae; truncate anteriorly. AE distinctly foveate only posterolateral to insertions of leg I but with further one or two inconspicuous depressions posterior to insertions of legs II. AE superficially smooth but in deeper layers finely punctate in median area (Fig. 10B). GA foveate lateral and posterior to GO. GO flanked by a pair of outlying setae and surrounded by 37 pgs; three pairs of short sgs. Adanal setae ventrally on anal cone.

Tectum wide and rounded (Fig. 10E). Ventral gnathosomal base foveate except for a wide area along median axis (Fig. 10F). Segment P-2 with ventral blunt protuberance and a seta inserted distal to protuberance.

Outline of legs as in Fig. 11. Telofemora ventrally smooth or with few shallow foveae. Chaetotaxy: I 1-2-2-4-5 (Fig. 11A), II 1-2-3-4-5 (Fig. 11B), III 1-1-2-3-5 (Fig. 11C), IV 1-1-2-3-5 (Fig. 11D). Claw-like seta of tibia I with proximal swelling. Paired claws of tarsi II-IV with accessory process but without pecten. Tarsus II with one ventral seta and pair of pas, tarsus III with one ventral seta and one pas, tarsus IV with two ventral setae but no pas.

Female. Idiosoma 380-390 long. AE in one female with few foveae posterior to insertions of leg II (Fig. 10C), in the other female without foveae at that position. GA with four pairs of pgs (Fig. 10D) or with four setae on one side and three setae on the other.

REMARKS. The only other species of *Simognathus* in which the cornea covers most of the OC is *S. exoticus* sp. nov. In *S. corneatus* sp. nov. the cornea is relatively shorter than in *S. exoticus* and the dome-like swelling of the AD is more developed. Also, the PD in *S. corneatus* is only about 1.15 times the length of the AD and carries less than 200 foveae whereas in *S. exoticus* it is 1.3 times the length of the AD and bears more than 250 foveae. Both species are otherwise similar and are undoubtedly closely related.

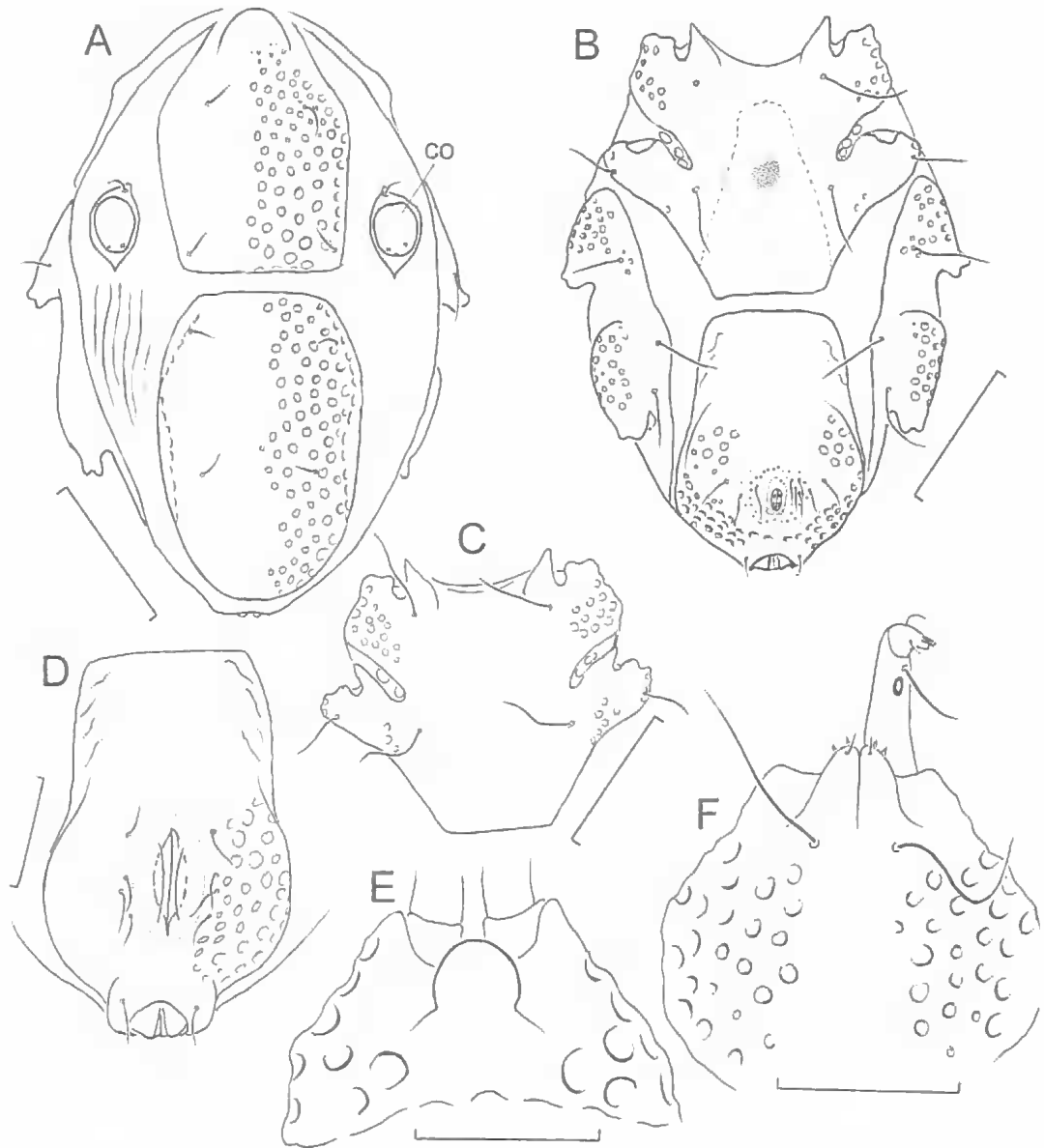


FIG. 10. *Simognathus corneatus* sp. nov., adult: A, idiosoma, dorsal view (co, cornea); B, ♂ idiosoma, ventral view; C, anterior epimeral plate of one ♀; D, ♀ genitoanal plate; E, gnathosoma, dorsal view; F, gnathosoma, ventral view. Scale bars: A-C = 100µm; D-F = 50µm.

***Simognathus exoticus* sp. nov.**
(Figs 12, 13)

Etymology. Greek, *exotikos* = alien, referring to this species' occurrence on the remote reefs of the Queensland Plateau.

MATERIAL. HOLOTYPE: QMS105355, ♂, Coral Sea (Queensland Plateau), Lihou Rf, ca. 17° 25' S 151° 40' E, 22 July 1998, D. Fenner, sand at 7m. **PARATYPES:**

QMS105356, ♀, data as for holotype; ANIC, ♀, ZMH A35/99, ♀, data as for holotype except for: 20 July 1998, sand at 5m; QMS105357, ♀, Coral Sea (Queensland Plateau), Flinders Rf, ca. 17° 35' S 148° 27' E, July 1998, D. Fenner, sand.

DESCRIPTION. Male. Idiosoma 356 long. AD uniformly pale; anteriorly with slight swelling (Fig. 12A). OC at least twice as long as wide;

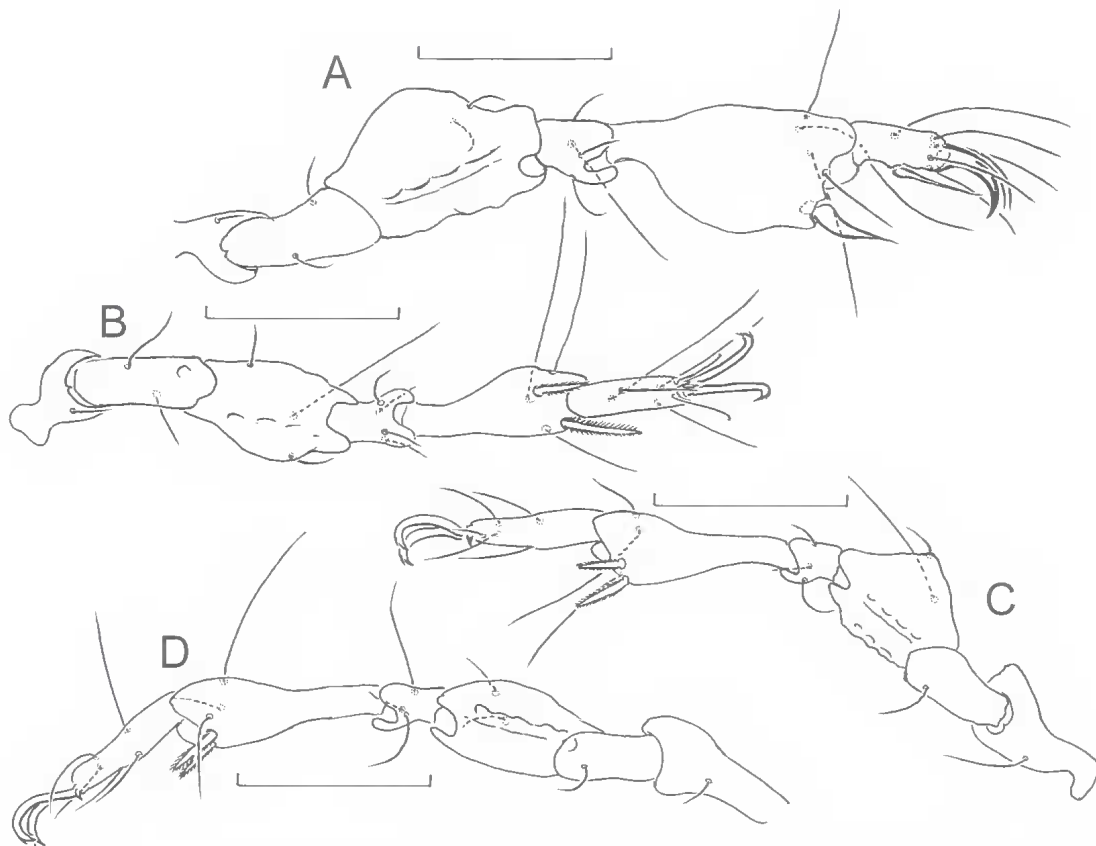


FIG. 11. *Simognathus corneatus* sp. nov., adult: A, leg I, medial view; B, leg II, ventral view; C, leg III, ventromedial view; D, leg IV, ventromedial view. Scale bars: A-D = 50 μ m.

anteriorly with seta on an extension of plate; cornea covering most of plate, posteriorly with few pore-like depressions. PD ca. 1.3 times longer than AD, with two pairs of setae and at least 250 foveae. AE with groups of foveae posterior to insertions of legs I and II (Fig. 12B). GA foveate laterally; with one pair of outlying setae, ca. 47 pgs and three pairs of short sgs. Pair of adanal setae positioned ventrally on anal cone.

Tectum wide and rounded (Fig. 9C). Ventral gnathosomal base laterally foveate, medially smooth (Fig. 9E). Segment P-2 with blunt ventral protuberance and seta.

Outline of legs as in Fig. 13. All segments without foveae. Chaetotaxy: I 1-2-2-4-5 (Fig. 13A), II 1-2-3-4-5 (Fig. 13B), III 1-1-2-3-5 (Fig. 13C), IV 1-1-2-3-5 (Fig. 13D). Claw-like ventral seta of tibia I with proximal swelling (Fig. 13A). Paired claws of tarsi II-IV with accessory process but without pecten. Tarsus II with ventral seta and

pair of pas, tarsus III with two ventral setae but no pas.

Female. Idiosoma 380-400 long. GA with 3-4 pgs (Fig. 12D); foveate area on either side of GO surpassing GO anteriorly.

REMARKS. The only other species of *Simognathus* in which the cornea covers most of the OC is *S. corneatus* sp. nov. For differences between these two species see the 'Remarks' to the latter.

***Simognathus platyaspis* sp. nov.**

(Figs 14, 15)

ETYMOLOGY. Greek, *platys* = wide, *aspis*, Greek = shield, referring to the species' wide anterior dorsal plate.

MATERIAL. HOLOTYPE: QMS105358, ♀, GBR, Bramble Rf, 28°26.36'S 146°42.24'E, 9 Apr. 1998, coarse sand & rubble at 6m. PARATYPES: ANIC, ♀, GBR, 18°25.25'S 146°40.65'E, Bramble Rf, 10 Apr. 1998, chunks of coral rubble at 3-6m; QMS105359, ♀, GBR, 18°40.60'S 146°34.29'E, Great Palm I., channel, 8 Apr. 1998, sand & rubble at 6m; QMS105360, ♀, GBR,

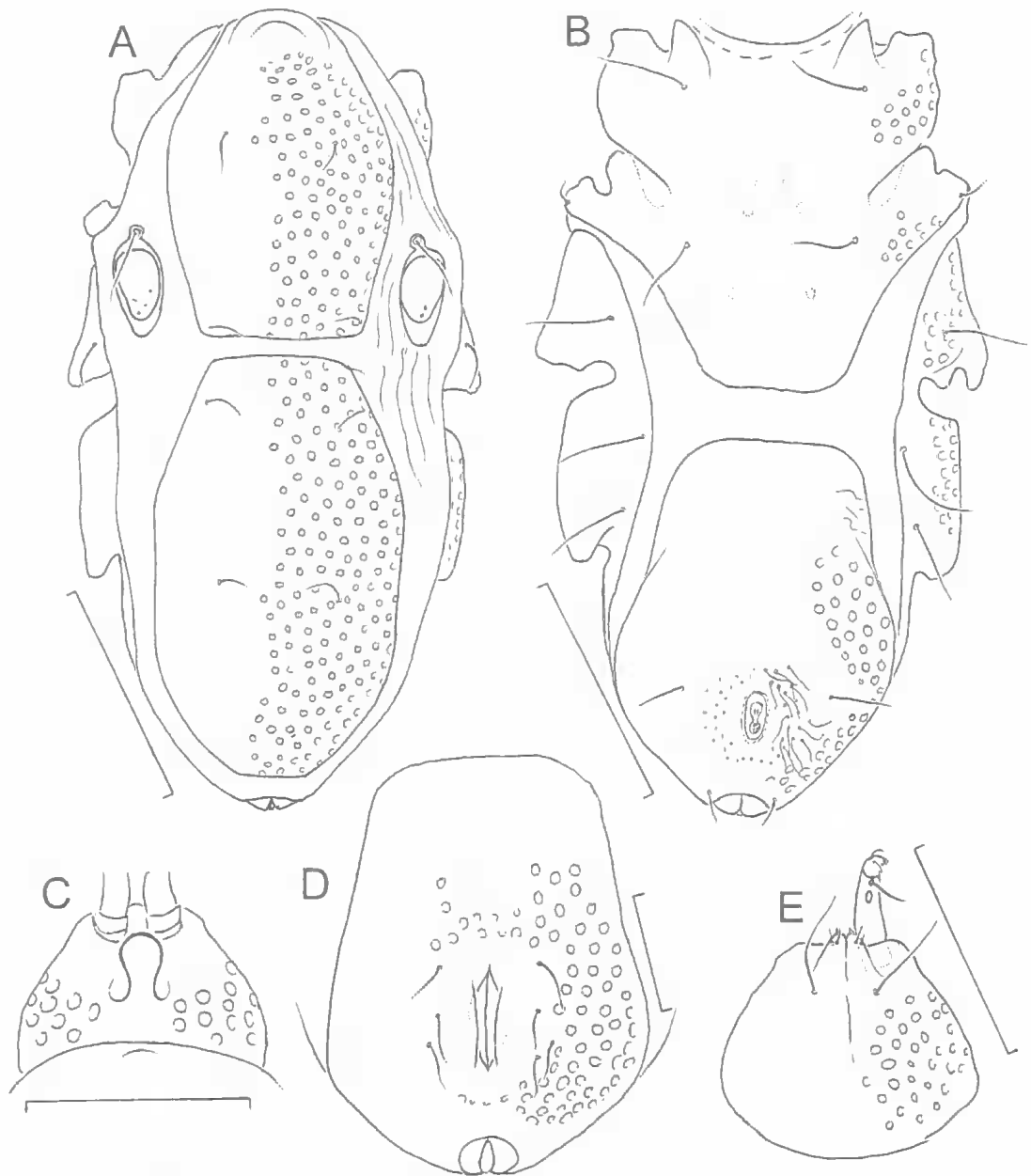


FIG. 12. *Simognathus exoticus* sp. nov., adult: A, idiosoma, dorsal view; B, ♂ idiosoma, ventral view; C, gnathosoma, dorsal view; D, ♀ genitoanal plate; E, gnathosoma, ventral view. Scale bars: A-C, E = 100µm; D = 50µm.

18°58.49'S 146°36.94'E, Phillips Rf, 16 Apr. 1998, chunks of rubble at 3-6m; QMS105361, ♀, GBR, 18°48.92'S 146°25.76'E, Pandora Rf, 22 Jan. 1998, coarse sand at 1 m; QMS105362, ♀, GBR, Boulder Rf, ca. 15°24'S 145°27'E, 8 Oct. 1998, A. Thompson, coarse sand at 2m; ZMH, ♀, GBR, Rosser Rf, ca. 15°37'S 145°33'E, 8 Oct. 1998, sand at 2m.

DESCRIPTION. *Female.* Idiosoma 306-364 long (holotype 329). AD slightly longer than PD; length/width ratio of AD 1.48-1.53 (Fig. 14A); anteriorly with swelling; posterior 2/3 of plate with conspicuous brown pigmentation. OC well developed; with several depressions in inner half;

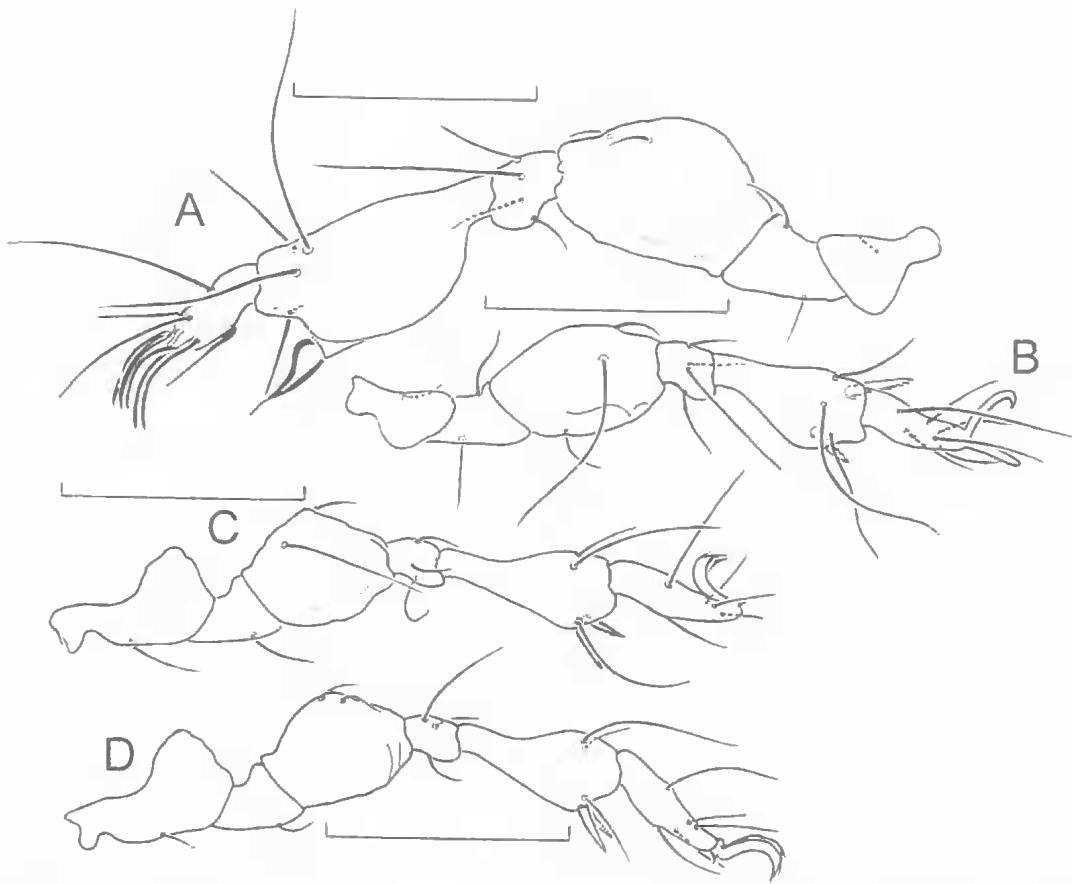


FIG. 13. *Simognathus exoticus* sp. nov., adult: A, leg I, lateral view; B, leg II, dorsal view; C, leg III, lateral view; D, leg IV, lateral view. Scale bars: A-D = 100 μ m.

seta either situated on OC or slightly separated from OC on a minute platelet. PD with two pairs of setae. AE foveate throughout except for an area between epimeres I and II. PE foveate. Underneath membranous cuticle posterior to AE with four conspicuous apodemes (Fig. 14B). Adanal setae positioned ventrally on anal cone.

Tectum shaped as in Fig. 14C. Ventral gnathosomal base foveate throughout. Segment P-2 with blunt protuberance proximal to ventral seta (Fig. 14D).

Outline of legs as in Fig. 15. Chaetotaxy: I 1-2-2-4-5 (Fig. 15A), II 1-2-3-4-5 (Fig. 15B), III 1-1-2-3-5 (Fig. 15C), IV 1-1-2-3-5 (Fig. 15D). Claw-like seta of tibia I with proximal swelling. Tarsi II-IV with paired claws bearing accessory process but no pecten. Tarsus II with ventral seta and pair of pas, tarsus III with ventral seta and single pas, and tarsus IV with two ventral setae but no pas.

Male. Unknown.

REMARKS. *Simognathus platyaspis* sp. nov. possesses brown pigmentation on the AD and foveae on the median part of the AE but lacks setae in the membranous dorsal cuticle. This combination of characters is otherwise known only for *S. fuscus* Viets, 1936, from the Caribbean and Bermuda. *Simognathus platyaspis* differs from *S. fuscus* by the length/width ratio of the anterior dorsal shield being less than 1.55 in contrast to 1.72 in *S. fuscus*.

***Simognathus pygmaeus* sp. nov.**
Figs 16, 17

ETYMOLOGY. Greek, *pygmaios* = dwarf, referring to the small size of this species.

MATERIAL. HOLOTYPE: QMS105364, ♀, GBR, Wonga Beach, 16°21'S 145°26'E, 31 July 1998, sand

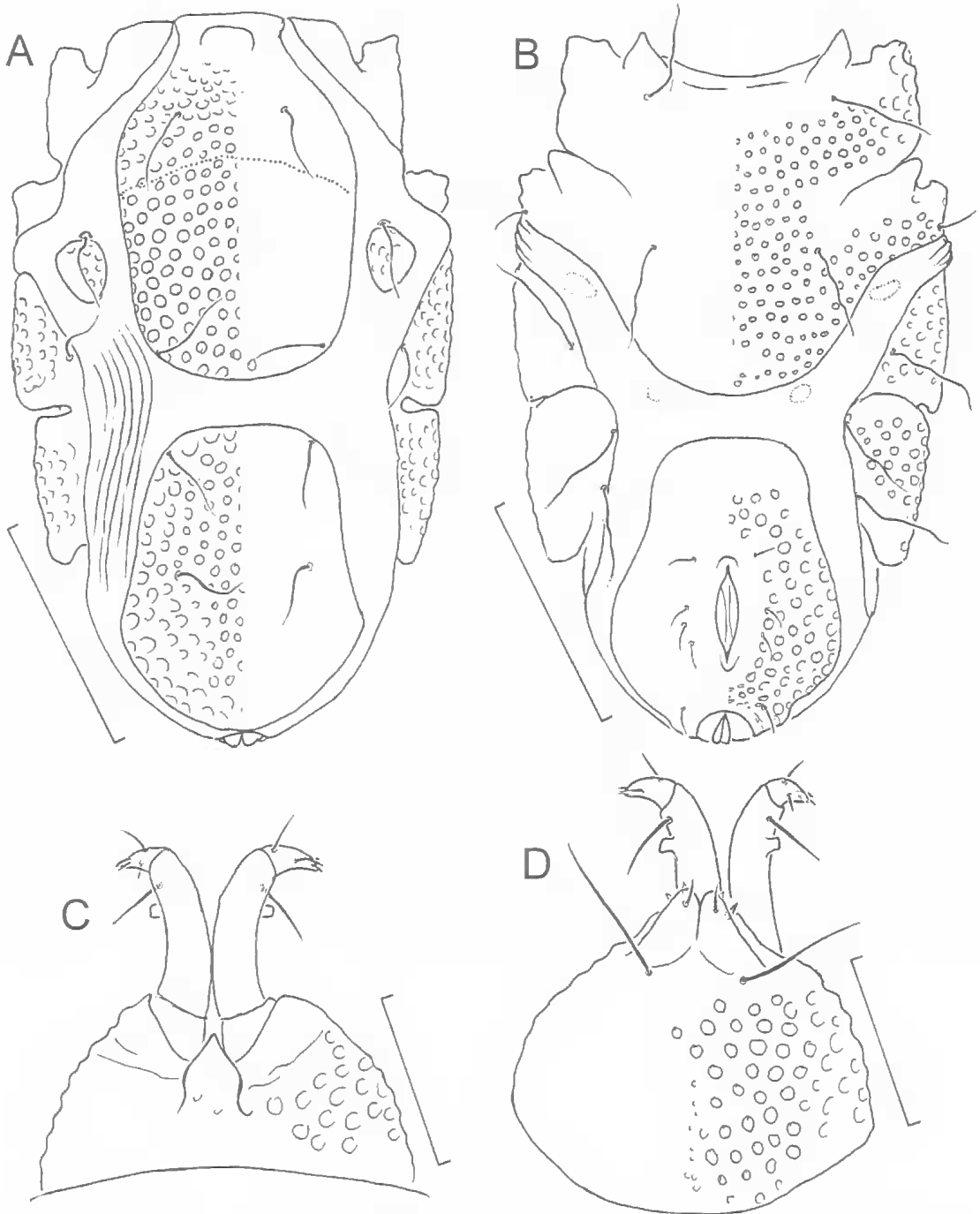


FIG. 14. *Simognathus platyaspis* sp. nov., adult: A, idiosoma, dorsal view (dotted line indicates anterior margin of brown part of plate); B, ♀ idiosoma, ventral view; C, gnathosoma, dorsal view; D, gnathosoma, ventral view. Scale bars: A,B = 100 μm; C,D = 50 μm.

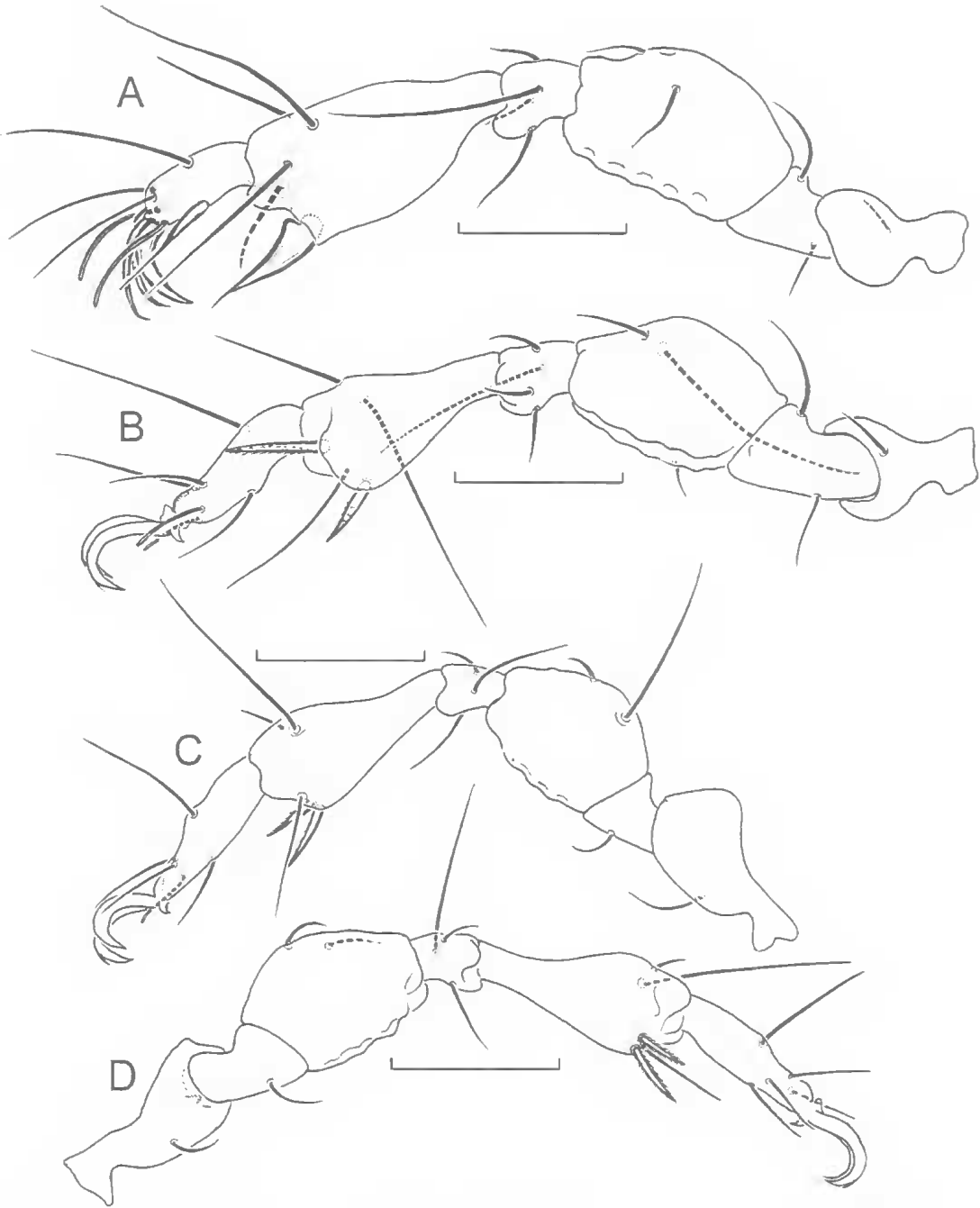


FIG. 15. *Simognathus platyaspis* sp. nov., adult: A, leg I, lateral view; B, leg II, medial view; C, leg III, lateral view; D, leg IV, medial view. Scale bars: A-D = 50 μ m.

below high tide mark, ca. 40cm below surface.
PARATYPE: QMS105365, ♀, data as for holotype.

DESCRIPTION. *Female*. Idiosoma 240-250 long (holotype 250). AD slender (Fig. 16A);

posterior margin rounded. OC reduced to narrow subcuticular platelets with pair of setae at anterior margin. Membranous cuticle anterior to PD with pair of setae. PD with two pairs of setae including

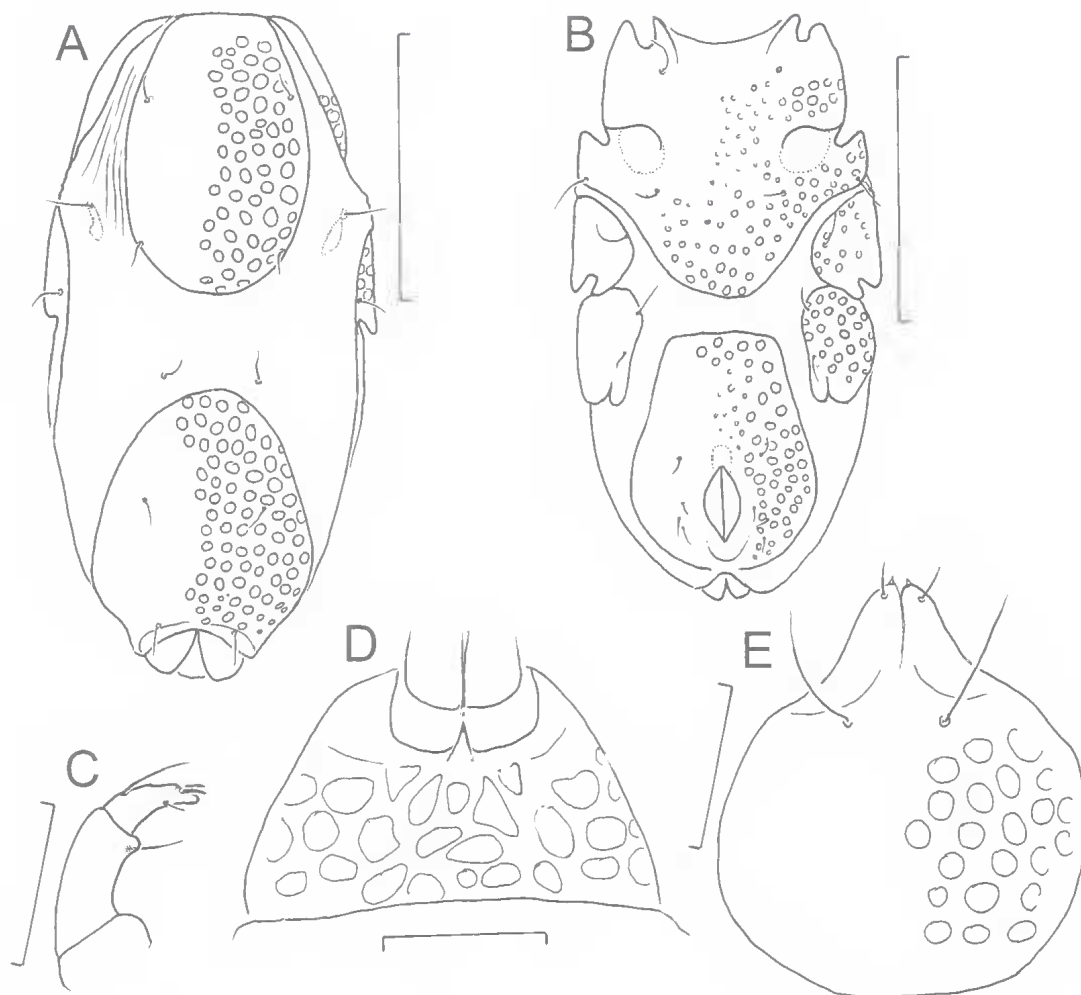


FIG. 16. *Simognathus pygmaeus* sp. nov., adult: A, idiosoma, dorsal view; B, ♀ idiosoma, ventral view; C, palp, medial view; D, gnathosomal base, dorsal view; E, gnathosoma, ventral view. Scale bars: A, B = 100µm; C-E = 25µm.

pair of adanal setae. AE with foveae throughout (Fig. 16B), marginal foveae more conspicuous than medial foveae; three pairs of setae as illustrated; epimeral vesicles large. GA foveate throughout.

Dorsal gnathosomal base with large irregular shaped foveae; tectum minute, pointed (Fig. 16D). Ventral gnathosomal base with relatively few large foveae (Fig. 16E). Segment P-2 with an apical swelling associated with a ventral seta (Fig. 16C); P-3 at least as long as half of P-2.

Outline of legs as in Fig. 17. Telfemur and tibia I with cuticular bars forming a reticulated pattern, inside each polygon with shallow pits (Fig. 17A). Chaetotaxy: I 1-2-1-4-5 (Fig. 17A), II

1-2-2-4-5 (Fig. 17B), III 1-1-2-3-5 (Fig. 17C), IV 1-1-1-3-4 (Fig. 17D). Ventral claw-like seta of tibia I relatively small compared with median claw of tarsus and without proximal swelling. Tibia II and III each with two ventral slightly denticulate spines; tibia IV with only one ventral spine (Fig. 17D). Tarsi II-IV with pair of pas and single ventral seta. Paired claws of tarsi II-IV with cluster of tines apically.

Male. Unknown.

REMARKS. With its posteriorly rounded AD, the minute OC, the relatively long palp tarsus in comparison to the palp tibia, the small body size, the irregular shaped foveae on the dorsal

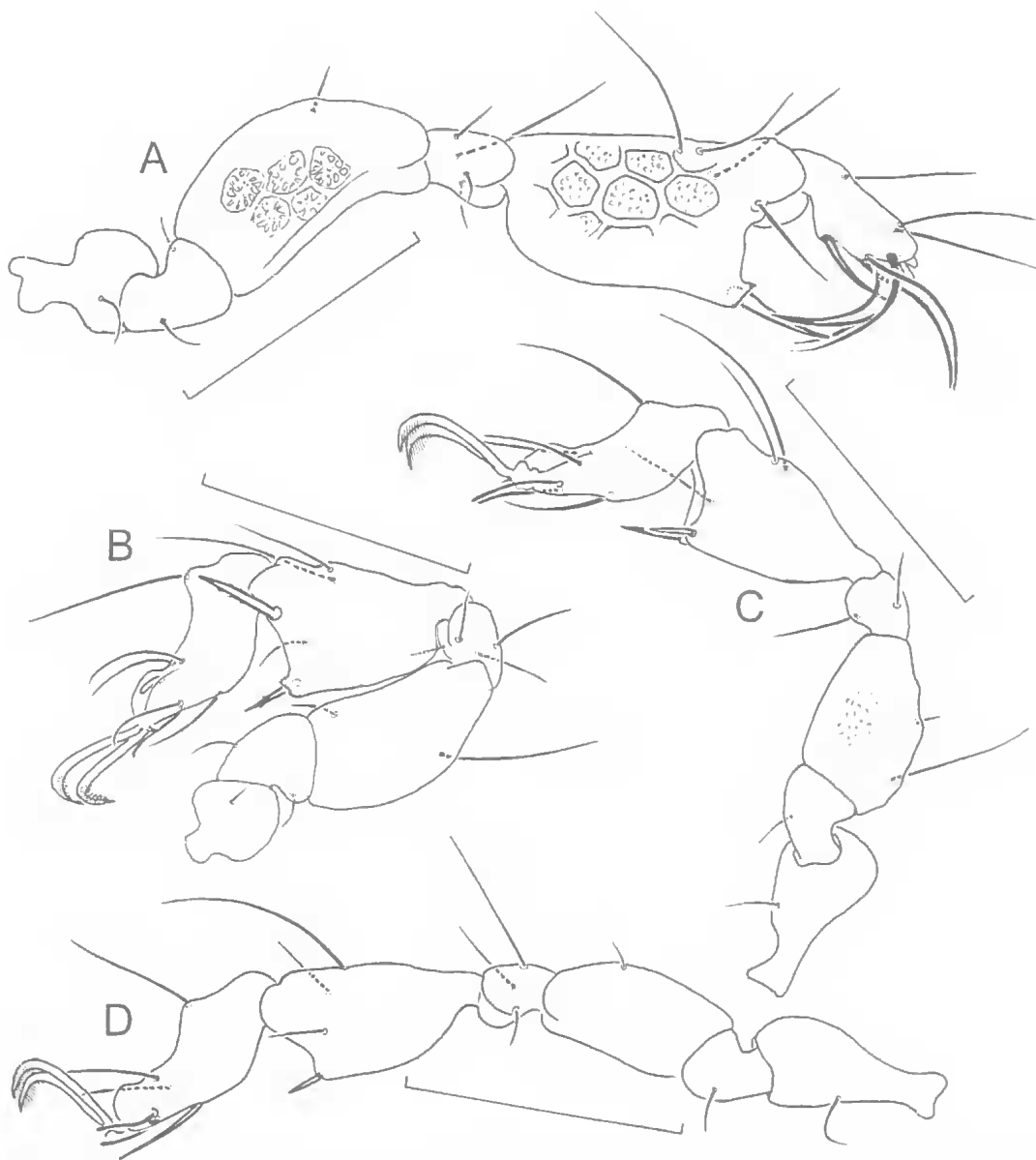


FIG. 17. *Simognathus pygmaeus* sp. nov., adult: A, leg I, medial view; B, leg II, medial view; C, leg III, medial view; D, leg IV, lateral view. Scale bars: A-D = 50 μ m.

gnathosomal base, and the apical cluster of pecten on the paired claws of legs II-IV. *Simognathus pygmaeus* sp. nov. appears most similar to *S. actius* sp. nov. and is likely to be the latter species' closest known relative. *Simognathus pygmaeus* differs from *S. actius* most conspicuously by the reticulated pattern on telofemur I. Other distinguishing characters are the presence of a pair of setae in the dorsal

membranous cuticle, foveae medially on the AE and having only one spine on tibia IV.

***Simognathus specialis* sp. nov.**
(Figs 18, 19)

ETYMOLOGY. Latin, *specialis*, = individual, particular, referring to the unusual shape of the foveae.

MATERIAL. HOLOTYPE: QMS105366, ♀, GBR, Myrmidon RI, 18°16.46'S 147°22.88'E, 13 Apr. 1998,

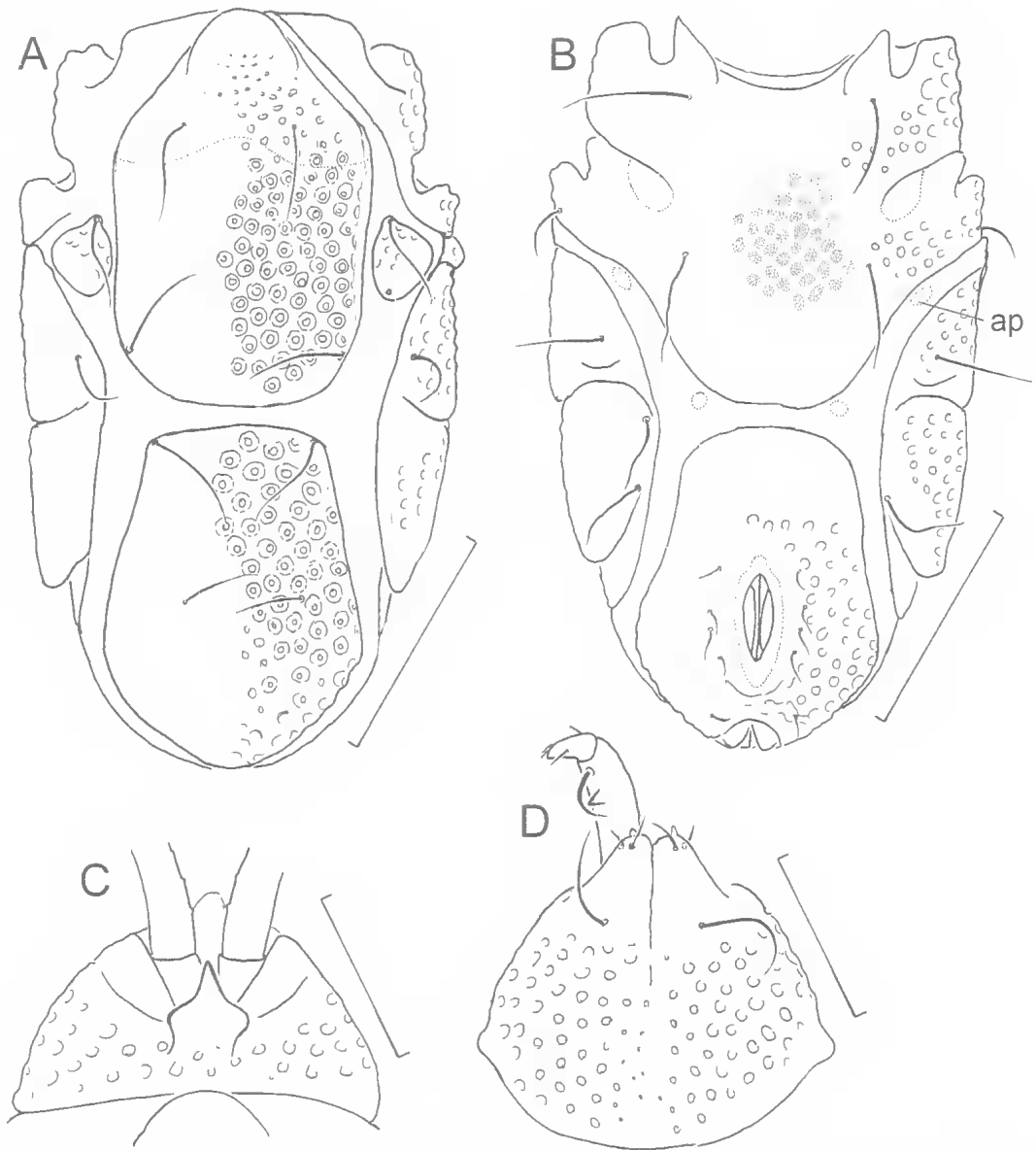


FIG. 18. *Simognathus specialis* sp. nov., adult: A, idiosoma, dorsal view (dotted line indicates anterior margin of brown part of plate); B, ♀ idiosoma, ventral view (ap, apodeme); C, gnathosomal base, dorsal view; D, gnathosoma and palp, ventral view. Scale bars: A,B = 100µm; C,D = 50µm.

coral rubble at 15m. PARATYPES: QMS105367, ♀, ANIC, ♀, ZMH A36/99, ♀, GBR, Myrmidon Rf, 18°16.46'S 147°22.88'E, 13 Apr. 1998, dead coral overgrown with algae, at 3-15m; QMS105368, ♀, GBR, Myrmidon Rf, 18°16.69'S 147°23.21'E, 14 Apr. 1998, coarse sand & rubble at 15m; QMS105369, ♀, GBR, Yonge Rf, ca. 14°36'S 145°38'E, 10 Oct. 1998, coarse sand & rubble at 9m; QMS105370, ♀, Coral Sea (Queensland Plateau), Chilcott I., 16°56.61'S 150°0.177'E, 14 Sep. 1998, G.A. Diaz-Pulido, coarse sand at 0.5m.

DESCRIPTION. *Female.* Idiosoma 276-320 long (holotype 320). AD slightly longer than PD, anteriorly narrowing and with dome-like swelling (Fig. 18A); posterior 2/3 of plate with brown pigmentation; setae long; foveae consisting of an inner depression and an outer less depressed rim. OC well developed; with several depressions in inner half, a seta anteriorly and a pore posteriorly. PD with foveate

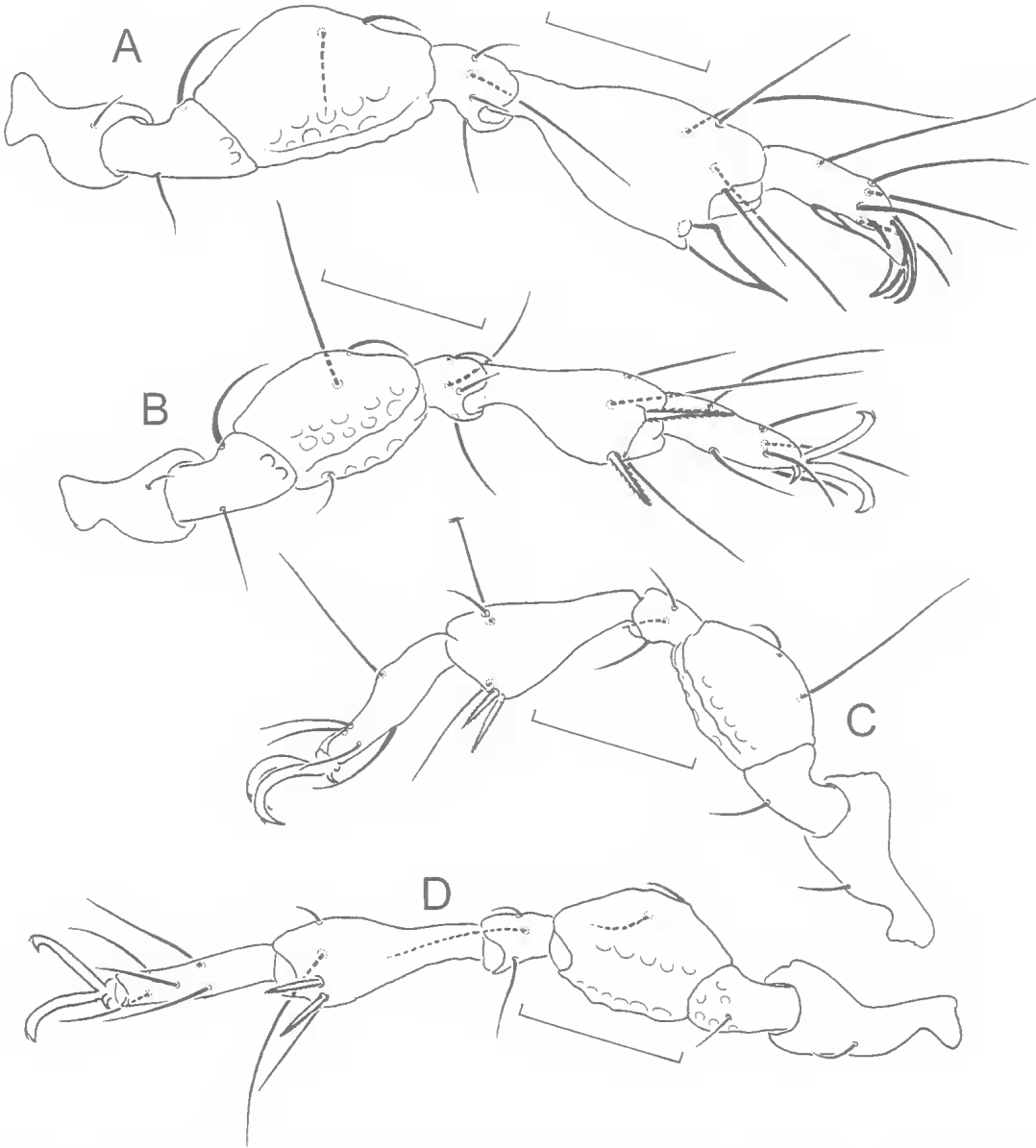


FIG. 19. *Simognathus specialis* sp. nov., adult: A, leg I, medial view; B, leg II, medial view; C, leg III, medial view; D, leg IV, medial view. Scale bars: A-D = 50 μ m.

ornamentation similar to that on AD; with two pairs of long setae. AE with foveae posterior to insertions of legs I and II; remainder of plate punctate with punctations forming groups (Fig. 18B). Underneath membranous cuticle between AE and GA with four conspicuous apodemes. GA foveate except for anterior third of plate. Adanal setae positioned ventrally on anal cone.

Shape of tectum as in Fig. 18C. Ventral gnathosomal base foveate throughout. P-2 with a pointed protuberance proximal to ventral seta.

Outline of legs as in Fig. 19. Telfemora with distinct foveae ventrally. Claw-like ventral seta of tibia I with proximal swelling (Fig. 19A). Chaetotaxy: I 1-2-2-4-5 (Fig. 19A), II 1-2-3-4-5 (Fig. 19B), III 1-1-2-3-5 (Fig. 19C), IV 1-1-2-3-5 (Fig. 19D). Paired claws of tarsi II-IV with

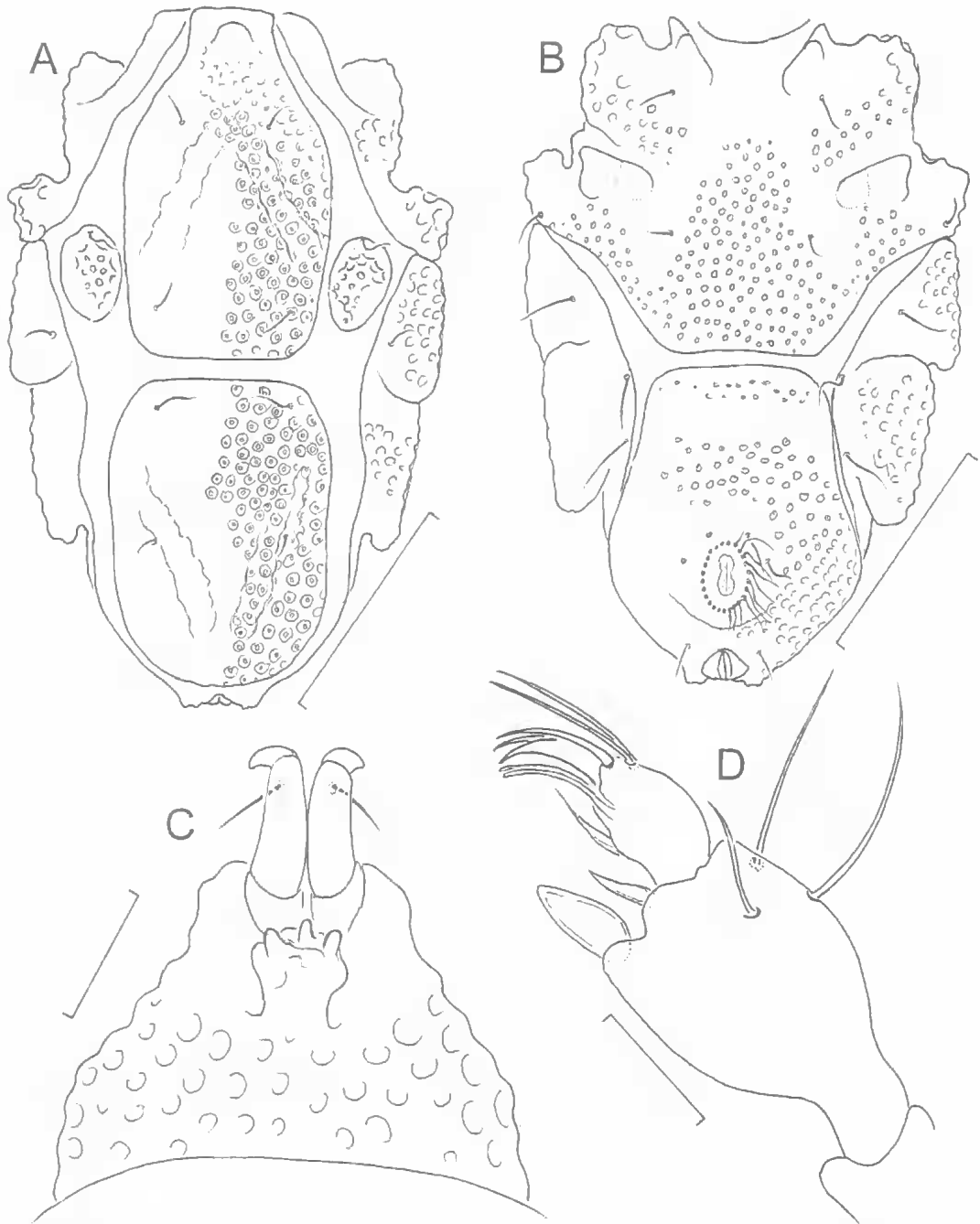


FIG. 20. *Simognathus trachys* sp. nov., adult. A, idiosoma, dorsal view; B, ♂ idiosoma, ventral view; C, gnathosoma, dorsal view; D, tibia and tarsus of leg I, medial view. Scale bars: A,B = 100 μ m; C,D = 25 μ m.

accessory process but without pecten. Tarsus II with one ventral seta and pair of pas, tarsus III with one pas and one ventral seta, tarsus IV with two ventral setae but no pas.

Male. Unknown.

REMARKS. In *Simognathus specialis* sp. nov. the dorsal idiosomal foveae consist of a deep

inner pit and a flat rim. Such foveae are otherwise known only for *S. trachys* sp. nov. from which *S. specialis* differs in a number of aspects: punctations on the AE arranged in groups, shape of the tectum and morphology of the claw of tibia I.

***Simognathus trachys* sp. nov.**
(Fig. 20)

ETYMOLOGY. Greek, *trachys* = rough, referring to the rough appearance of the tectum.

MATERIAL. HOLOTYPE: QMS105371, ♂, GBR, Elizabeth Rf, 19°20.12'S 149°02.85'E, 24-25 Dec. 1997, coral rubble at 10m. PARATYPES: QMS105372, ♀, ANIC, ♀, ZMH A37/99, ♀; QMS105373, ♂, data as for holotype; QMS105374/105375, 2 ♀s, data as for holotype, except from medium coarse sand at 10m.

DESCRIPTION. *Male*. Idiosoma 284-299 long (holotype 299). AD slightly longer than PD, uniformly pale, posteriorly truncated; covered with foveae which consist of deep depression and a shallower rim (Fig. 20A); anteriorly narrowing and with a swelling; two pairs of setae inserted as illustrated; with pair of slightly elevated ridges that converge anteriorly; no canaliculi seen in deeper cuticular layers on either AD or PD. OC well developed; covered with foveae except for posterolateral smooth area (cornea); anteriorly with a seta. PD truncated anteriorly; anteriorly and posteriorly of similar width; with two pairs of setae as illustrated; pair of slightly elevated ridges, converging posteriorly. AE covered by foveae except for a smooth gable-like area (Fig. 20B). GA separated from AE; with foveae except for a transverse area anteriorly. GO surrounded by a circle of ca. 25 pgs; one or two pairs of outlying setae anterolateral to GO. Adanal setae inserted ventrally on anal cone.

Gnathosomal base dorsally and ventrally foveate. Tectum of variable shape but always with several protuberances (Fig. 20C). Palps inserted well anteriorly, segment P-2 with a ventral seta but no protuberance.

Leg chaetotaxy: I 1-2-2-4-5, II 1-2-3-4-5, III 1-1-2-3-5, IV 1-1-2-3-5. Tibia I with a blunt ventral spine and adjacent to it with a thickened seta (Fig. 20D). Paired claws of tarsi II-IV with accessory process but without pecten. Tarsus II with one ventral seta and pair of pas, tarsus III with one pas and one ventral seta, tarsus IV with two ventral setae but no pas.

Female. Idiosoma 309-329 long. GA with distribution of foveae as in male but with 3-4 pairs of pgs on either side of GO.

REMARKS. With its short and blunt ventral spine and thickened seta on tibia I *Simognathus trachys* sp. nov. closely resembles *S. gibberosus* Bartsch, 1994, from Rottneest I. Both species are also similar in most other respects, for example the distribution of the foveae on the AE and the shape of the tectum, which indicates their close relationship. However, the AD in *S. gibberosus* carries canaliculi in deeper cuticular layers which are absent in *S. trachys*. Further, the PD in *S. gibberosus* narrows posteriorly, whereas in *S. trachys* it is of similar width anteriorly and posteriorly, and the foveae in *S. trachys* possess a wide rim which is unknown for *S. gibberosus*. Finally, in the males of *S. gibberosus* the AE and GA are fused according to Bartsch (1994), while such fusion has not been observed in *S. trachys*. However, I examined a male paratype of *S. gibberosus* (WAM 93/440) in which the AE was not fused to the GA, and thus it appears this character may not be reliable.

***Simognathus versicolor* sp. nov.**
(Fig. 21)

ETYMOLOGY. Latin, *versicolor* = variegated, of various colours, referring to the pigmented AD.

MATERIAL. HOLOTYPE: QMS105376, ♀, GBR, Elizabeth Rf. 19°20.12'S 149°02.85'E, 24 Dec. 1997, large chunks of coral rubble at 10m.

DESCRIPTION. *Female*. Idiosoma 311 long. AD and PD subequal in length (Fig. 21A); posterior 2/3 rd of plate with brown pigmentation. OC well developed; on inner half with several depressions; anteriorly with a seta. AE foveate posterior to insertions of legs I and II, remainder of plate uniformly punctate (Fig. 21B). Underneath membranous cuticle between AE and GA with four conspicuous apodemes. Morphology of GA as described and illustrated for *S. specialis*. Adanal setae inserted ventrally on anal cone.

Tectum shaped as in Fig. 21C. Ventral gnathosomal base foveate except for a narrow strip along median axis. Segment P-2 with a blunt ventral protuberance.

Legs as described and illustrated for *S. specialis*.

REMARKS. *Simognathus versicolor* sp. nov. lacks foveae on the median part of the AE and has brown pigmentation on the posterior part of the AD. This combination of characters is otherwise

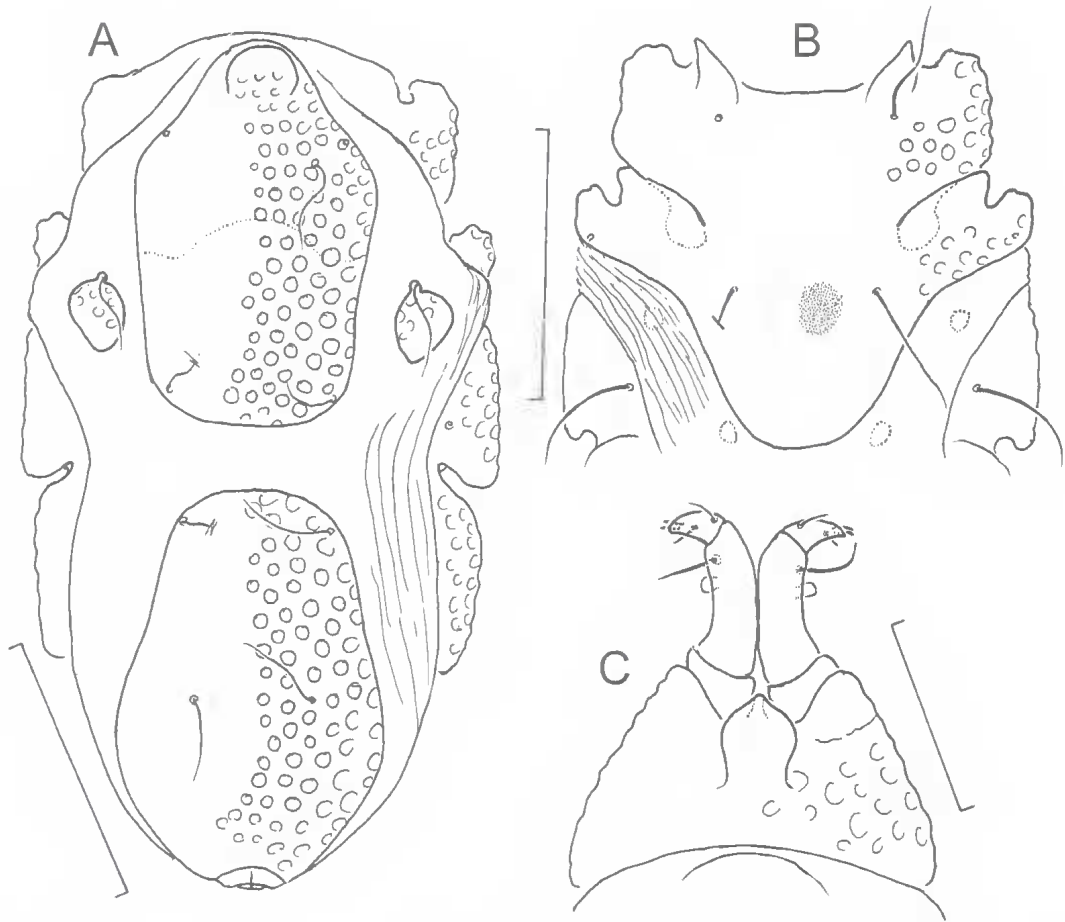


FIG. 21. *Simognathus versicolor* sp. nov., ♀: A, idiosoma, dorsal view (dotted line indicates anterior margin of brown part of plate); B, anterior half of idiosoma, ventral view; C, gnathosoma, dorsal view. Scale bars: A,B = 100µm; C = 50µm.

known only for *S. maculatus* Bartsch, 1994, from Rottneet I., and *S. specialis* sp. nov. from the Great Barrier Reef. *Simognathus versicolor* differs from *S. specialis* by lacking a rim around the dorsal foveae and from *S. maculatus* by its smaller size, relatively larger foveae on the dorsal plates, and by the posteriorly widened PD.

***Simognathus xandaros* sp. nov.**
(Fig. 22)

ETYMOLOGY. Greek, *xandaros*, = a fabulous sea-monster.

MATERIAL. HOLOTYPE: QMS105377, ♀, GBR, Turner Cay, NE, ca. 21°43'S 152°33'E, reef flat, 8 Dec. 1998, G. Coleman, medium coarse sand at 3m. PARATYPE. QMS105378, ♀, GBR, John Brewer Rf, 18°38.25'S 147°04.42'E, 11 Apr. 1998, coarse sand at 15m.

DESCRIPTION. *Female*. Idiosoma 333-339 long (holotype 333). AD as long as PD (Fig. 22A), ca. 1.3 times longer than wide; posterior 2/3 of plate with brown pigmentation, in deeper cuticular layers with numerous fine canaliculi. OC well developed; anteriorly with several depressions and a seta. AE laterally foveate, remainder of plate uniformly punctate (as for *S. versicolor* in Fig. 21B). Underneath membranous cuticle between AE and GA with four conspicuous apodemes. Morphology of GA as described and illustrated for *S. specialis*. Adanal setae inserted ventrally on anal cone.

Tectum pointed (Fig. 22B). Ventral gnathosomal base foveate throughout. Segment P-2 with a blunt ventral protuberance proximal to seta. Rostrum not extending to level of ventral protuberance.

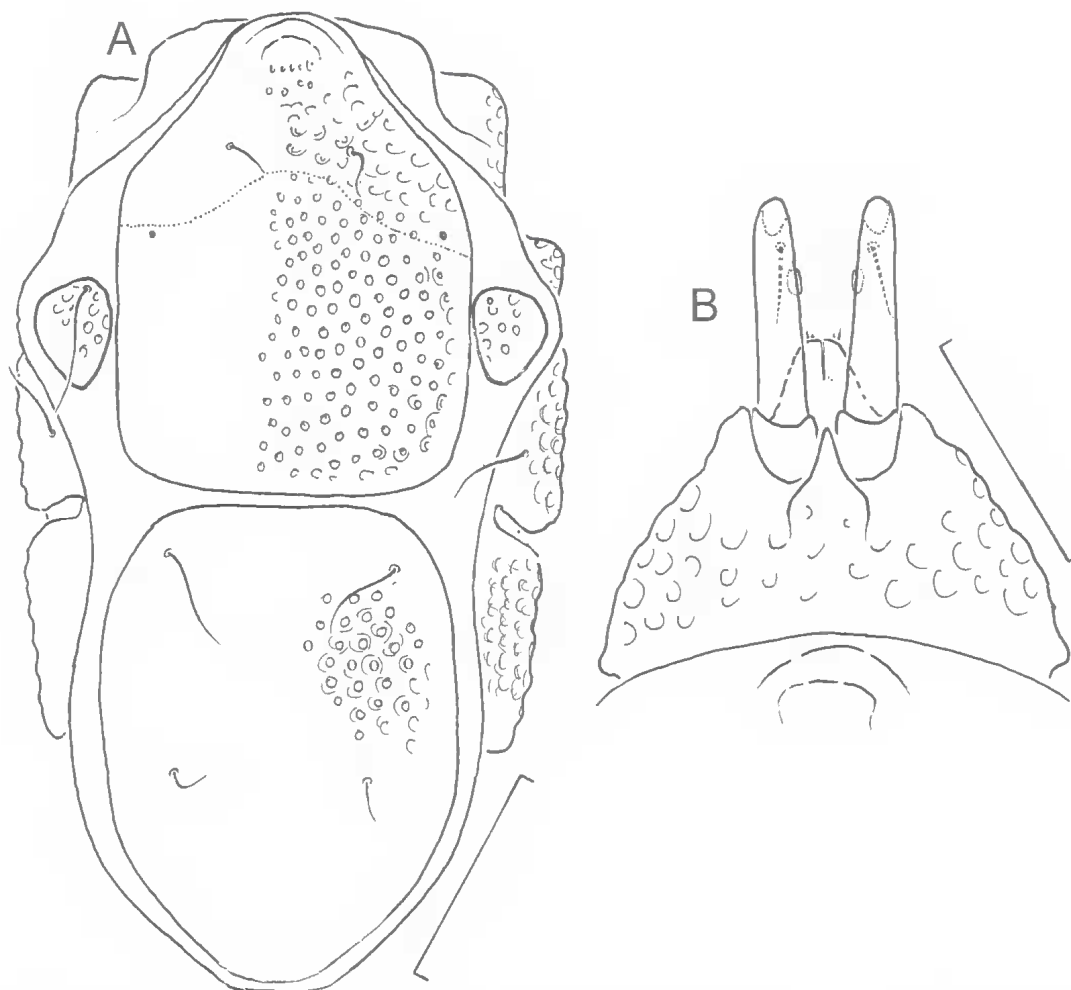


FIG. 22. *Simognathus xandarus* sp. nov., ♀: A, idiosoma, dorsal view; B, gnathosoma, dorsal view. Scale bars: A, B = 50 μ m.

Legs as described and illustrated for *S. specialis*.

REMARKS. The only other species with dark brown pigmentation in the posterior 2/3 of the AD and foveae on the AE restricted to the margins of the plate are *S. maculatus* Bartsch, 1996, *S. specialis* sp. nov. and *S. versicolor* sp. nov. *Simognathus xandarus* sp. nov. differs from all these species by a relatively wider AD. In addition, *S. xandarus* may be distinguished from *S. maculatus* by the rostrum not reaching the level of the ventral protuberance on P-2, from *S. specialis* by lacking a distinct rim around the foveae on the AD and not having the punctations on the AE arranged in groups, and from *S. versicolor* by having a larger number of foveae on the AD and a distinctly pointed tectum.

KEY TO AUSTRALIAN SPECIES OF SIMOGNATHINAE

1. Palp two-segmented (Fig. 2a); genu I with a spinose seta (Fig. 2B) *Acaromantis diazpulidoi* sp. nov.
Palp three-segmented (Fig. 5d), genu I without a spinose seta (Fig. 4A) 2, *Simognathus*
2. Posterior 2/3 of AD with dark brown pigmentation (Fig. 14A) 3
AD uniformly pale 7
3. AE with foveae throughout (Fig. 14B) *S. platyaspis* sp. nov.
AE with foveae only marginally (Figs 18B, 21B) 4
4. Foveae of AD consisting of an inner deep depression and a flat rim (Fig. 18A); AE with punctations that form distinct groups (Fig. 18B) *S. specialis* sp. nov.
Foveae of AD consisting of only a simple depression without a rim (Fig. 21A); AE in non-foveate areas evenly punctate (Fig. 21B). 5

5. PD pear-shaped, distinctly wider posteriorly than anteriorly, anterior margin rounded (Fig. 21A) *S. versicolor* sp. nov.
 PD posteriorly not distinctly widened, anterior margin truncate (Fig. 22A) 6
6. Length of AD ca. 1.3 times its width (Fig. 22A); rostrum not reaching level of ventral protuberance on P-2 (Fig. 22B) *S. xandarasp* sp. nov.
 Length of AD ca. 1.5 times its width; rostrum reaching beyond level of ventral protuberance on P-2 *S. maculatus* Bartsch, 1994
7. OC well developed, not obscured by membranous cuticle (Fig. 10A) 8
 OC plates strongly reduced or absent, if present then hidden underneath membranous cuticle (Figs 3A, 5A, 7A) 11
8. Cornea (= non-foveate part of plate) covering most of OC (Figs 10A, 12A), AE foveate only marginally (Figs 10B, 12B) 9
 Cornea smaller (Figs 14A, 18A, 20A); AE foveate marginally and medially (Fig. 14B) 10
9. Cornea as in Fig. 12A; PD ca. 1.15 times the length of AD (Fig. 12A) *S. exoticus* sp. nov.
 Cornea as in Fig. 10A; PD ca. 1.3 times the length of AD (Fig. 10A) *S. corneatus* sp. nov.
10. PD narrowing posteriorly; foveae of AD and PD without a rim; AD and PD with canaliculi in deeper cuticular layers; idiosoma of ♀ 357-408µm long, of ♂ 325-376µm *S. gibberosus* Bartsch, 1994
 PD anteriorly and posteriorly of similar width (Fig. 20A); foveae of AD and PD with a rim (Fig. 20A); AD and PD without canaliculi in deeper cuticular layers; idiosoma of ♀ 309-329µm long, of ♂ 284-299µm *S. trachys* sp. nov.
11. AE and GA fused (Figs 3B, 7B, 9B) 12
 AE and GA separated (Fig. 5B) 16
12. AE foveate (Figs 3B, 7B) 13
 AE finely punctate (Fig. 9B) *S. clypeatus* sp. nov.
13. Tarsi of leg I (excluding claws and setae) about ¼ of tibia length, length of tibia I ca. 3 times its height (Fig. 4A) 14
 Tarsi of leg I (excluding claws and setae) longer than 1/3 of tibia, length of tibia I ca. twice its height (Fig. 8A) 15
14. AD of subequal length and width (Fig. 3A); ventral gnathosomal base with a wide non-foveate area medially (Fig. 3E) *S. abnormalus* sp. nov.
 AD clearly longer than wide; ventral gnathosomal base lacking a wide non-foveate area *S. scutatus* Bartsch, 1993b
15. Tarsi III and IV with two pas (Fig. 8C,D) *S. aspidiotus* sp. nov.
 Tarsi III and IV with one pas *S. uniscutatus* Bartsch, 1994
16. AE foveate throughout (Fig. 16B) 17
 AE foveate only posterior to insertion of leg I *S. delicatulus* Bartsch, 1994
 AE foveate posterior to insertion of leg I and II, and along posterior margin (Fig. 5B) *S. actius* sp. nov.
17. Telofemur I with one seta (Fig. 17A), tibia IV with one spine (Fig. 17D) *S. pygmaeus* sp. nov.
 Telofemur I with two setae (Fig. 8A), tibia IV with two spines (Fig. 8D) 18
18. Tarsus IV with two pas and two ventral setae *S. variolosus* Bartsch, 1994
 Tarsus IV with one pas and one ventral seta *S. gracilis* Bartsch, 1994

DISCUSSION

Simognathus and *Acaromantis* are very similar in many characters which makes their separation difficult. According to Bartsch (1983, 1993b) *Acaromantis* possesses two palp segments while *Simognathus* has three segments, P-2 in *Simognathus* has a cuticular protuberance which is lacking in *Acaromantis*, the tarsus of leg I is shorter in *Acaromantis* than in *Simognathus* and paired claws are absent in *Acaromantis* while present in *Simognathus*. However, several species do not fit this diagnosis: *Simognathus gibberosus* Bartsch, 1994, and *S. gracilis* Bartsch, 1994, seem to lack a ventral protuberance on P-2 and *S. scutatus* Bartsch, 1993b, has a front leg tarsus which is as short as that of *Acaromantis* species. *Acaromantis* is therefore here redefined as all those simognathine species that have two palp segments, a spinose seta on genu I and no paired claws on tarsus I, and *Simognathus* as those that have three palp segments, slender seta-like paired claws on tarsus I and lack a spinose seta on genu I.

While *Acaromantis* defined as above is most likely a monophylum this is uncertain for *Simognathus*. Paired claws on tarsus I and lack of a coarsely spinose seta on genu I are a common character of halacarids and are therefore plesiomorphic in *Simognathus*. The possession of three palp segments may be synapomorphic for *Simognathus* but is more likely an intermediate step between the four segments typical for most other halacarid genera and the two segments of *Acaromantis* in which case it would not constitute a synapomorphy.

Support for the hypothesis that *Simognathus* may be paraphyletic comes from the observation that the closely related species *S. scutatus* and *S. abnormalus* both have a slender tibia and very short tarsus of leg I, which is typical of *Acaromantis* but not present in other *Simognathus* species. Further, in *S. abnormalus* these segments are oriented so that the spine of the tibia and the median claw of the tarsus are medially directed, and in all alcohol-preserved material leg I is held distinctly raised above the body, characters which are both typical of *Acaromantis* (Bartsch, 1977; pers. comm.). The peculiar orientation of tibia and tarsus of leg I can also vaguely be seen in the holotype and a paratype of

S. scutatus which I examined, although due to the compression of the specimens and the fact that some of the legs are detached it is difficult to detect. Thus both species, *S. abnormalus* and *S. scutatus*, may in fact be more closely related to species of *Acaromantis* than to their congeners. A further character which may indicate a possible parphyly of *Simognathus* is the reduced OC, common to all species of *Acaromantis* and several species of *Simognathus*. While it is possible that the reduction of OC has occurred several times, there is no evidence for it and it is therefore more parsimonious to assume that reduction has occurred once and therefore that species of *Simognathus* with reduced plates are more closely related to *Acaromantis* than to their congeners with well developed plates. However, at present the current classification is here retained.

Simognathus now contains 37 species. Together with the seven species described from Rottneest I., 19 species are known from Australia, which has the highest recorded number of *Simognathus* species of any continent. Two species are currently known from North America and the Caribbean, nine from South America (including the Galapagos), one from Africa, four from Europe, two from Asia and four from New Zealand and subantarctic islands. Since the halacarid fauna of the northern hemisphere has been studied much more thoroughly than that of the southern hemisphere it appears almost certain that this genus is more diverse in the southern hemisphere.

Acaromantis now contains ten species: *A. arenarius* Bartsch, 1980, from the east coast of North America, *A. armatus*, *A. grandiculus*, *A. fastigatus*, *A. punctulatus* and *A. subasper* from the Galapagos I. (Bartsch 1977), *A. minutus* Bartsch, 1976, and *A. squilla* Trouessart and Neumann, 1893, from the French Atlantic coast, *A. monnioti* Morselli, 1970, from the Mediterranean, and *A. diazpulidoi* sp. nov. from the Coral Sea.

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